

# CLINICAL PRACTICE GUIDELINES

## MANAGEMENT OF FOREIGN BODY INGESTION IN CHILDREN



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**STATEMENT OF INTENT**

This clinical practice guideline (CPG) is meant to be a guide for clinical practice based on the best available evidence at the time of development. The guideline should not override the responsibility of the practitioners to make decision appropriate to the circumstances of the individual. This should be done in consultation with the patients and their families or guardians, taking into account the management options available locally.

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## KEY RECOMMENDATIONS

The following recommendations are highlighted by the CPG Development Group (DG) as the key recommendations that answer the main questions addressed in the CPG and should be prioritised for implementation.

### TRIAGE

- Triage should be performed in all children with suspected foreign body ingestion.

### DIAGNOSIS AND ASSESSMENT

- Plain radiographs should be the first-line imaging modality for most foreign body ingestion in children.
- Abdominal ultrasonography should be done for superabsorbent polymer objects ingestion in children.
- Gastrointestinal (GI) contrast study and computed tomography scan (CT)/magnetic resonance imaging (MRI) should be done for suspected sharp radiolucent objects and complications of foreign body ingestion in children.

### TREATMENT

- Endoscopic removal should be done for all foreign body ingestion in children lodged in:
  - oesophagus, regardless of symptoms
  - stomach, presenting with symptoms
- Urgent endoscopic removal within 24 hours should be done for all asymptomatic children with button battery in the stomach if:
  - child aged <5 years, OR
  - button battery  $\geq 20$  mm in diameter
- In asymptomatic children aged  $\geq 5$  years with <20 mm button battery in the stomach, repeat abdominal X-ray at 10 - 14 days. If the button battery is still in the stomach, endoscopic removal should be done.
- Endoscopic removal should be done for all sharp foreign bodies in the stomach, however those who are asymptomatic, spontaneous passage may be allowed.
- Asymptomatic patients with sharp objects ingestion beyond the duodenum requires repeat abdominal X-ray after 3 - 5 days and removal if there is no progression.
- Surgical intervention should be done in children with foreign body ingestion when there is:
  - foreign body-related complications (absolute indication)
  - failure of conservative management or endoscopic removal
  - symptomatic patients with foreign body lodged beyond the duodenum

## DISCHARGE AND FOLLOW-UP

- A child with foreign body ingestion may be safe for discharge if all the following clinical criteria are met:
  - the child is well appearing
  - pain-free
  - not in respiratory distress
  - able to eat and drink
  - with a reliable history and the ingested object is considered a low-risk foreign body  
(a low-risk foreign body means it does not belong to a high-risk foreign body as listed in section 3.1)
- Asymptomatic children with the following foreign body ingestion may be considered for discharge and follow-up:
  - children  $\geq 5$  years of age with  $< 20$  mm button battery ingestion beyond the oesophagus
  - single magnet ingestion beyond the oesophagus
  - blunt object ingestion beyond the oesophagus
- Caregivers of children with foreign body ingestion should be advised to seek urgent medical attention if any of the following symptoms are present.
  - respiratory distress
  - abdominal pain or distension
  - persistent vomiting
  - fever
  - inability to tolerate oral intake
  - gastrointestinal bleeding (e.g., hematemesis or melaena)
- Children  $\geq 5$  years old with button battery  $< 20$ mm in size in stomach should be followed up with:
  - repeated radiographs at 10 to 14 days
  - endoscopic removal if retained in the stomach
- Follow-up endoscopic assessment (with or without gastrointestinal (GI) contrast study) should be done in symptomatic children with foreign body ingestion following removal of foreign body.
- GI contrast study evaluation 4 weeks after button battery removal (to look for evidence of esophageal stenosis) may be considered in mild or asymptomatic children with foreign body ingestion.

## PREVENTION

- To prevent foreign body ingestion in children, caregivers should be advised to:
  - purchase age-appropriate toys
  - keep small objects out of reach of young children
  - tape shut battery compartments on toys and all household products
  - store batteries and magnets in locked safety boxes out of reach of children
  - avoid purchasing rare earth magnets in households with young children

## **GUIDELINES DEVELOPMENT AND OBJECTIVES**

### **OBJECTIVES**

The objective of this CPG on the Management of Foreign Body Ingestion in children is to provide evidence-based recommendations and guidance to healthcare professionals in the holistic management of foreign body ingestion on the following aspects:

- assessment and diagnosis
- treatment
- referral and follow-up

### **POPULATION, USERS AND SETTINGS**

#### **TARGET POPULATION**

##### **Inclusion Criteria**

- All patients  $\leq 18$  years old with foreign body ingestion (non-edible objects, which are button batteries, sharp objects, magnets, coins/blunt objects and superabsorbent polymer objects)

##### **Exclusion Criteria**

- Inhalation of a foreign body
- Food bolus ingestion
- Corrosive ingestion

#### **TARGET USERS**

This document is intended to guide healthcare professionals and relevant stakeholders in primary and secondary/tertiary care of both public and private sectors in the management of foreign body ingestion in children including:

- i. medical doctors
- ii. allied health professionals
- iii. trainees and medical students
- iv. patients, caregivers and their advocates
- v. policy makers

**HEALTHCARE SETTINGS:** Primary, secondary and tertiary care

**SPONSORSHIP & FUNDING:** The development of the CPG on Management of Foreign Body Ingestion in Children was supported financially in its entirety by the MoH.

### **GROUPS AND ROLES**

**Development Group (DG):** A multidisciplinary team that used a standard methodology based on systematic evidence review to plan, critically appraise and formulate evidence-based recommendations.

**Review Committee (RC):** A senior multidisciplinary group actively involved throughout the development process providing technical oversight.

**External Reviewers (ER):** Local and international subject matter experts that provided an independent assessment of the draft.

**Disclosure Statements/ Conflicts of interest (Col):** All panel members both DG and RC declared financial and non-financial interests. None held shares in pharmaceutical firms or acts as consultants to such firms. Details are available upon request from the CPG Secretariat.

**Meetings:** The DG members met 28 times throughout the development of these guidelines.

## **CLINICAL QUESTIONS AND SCOPE** (*Refer Appendix 1*)

A total of 8 main **clinical questions (CQs)** were developed under specific sections with patient-important outcomes prioritised. DG members were assigned individual CQs within these sections.

## **EVIDENCE RETRIEVAL** (*Refer Appendix 2: Example Search Strategy*)

**Databases & sources:** Medline (Ovid) and Cochrane Database of Systematic Reviews; supplementary searches in PubMed and others.

**Limits:** Literature published in the last 20 years from 2004 to 2024 for all CQs on Humans and in English; In addition, the reference lists of all retrieved literature and guidelines were searched to further identify relevant studies. Experts in the field were also contacted for studies related to the issues addressed.

**Search period:** All searches were conducted from 3 until 12 March 2024. The literature search was repeated for all CQs at the end of the CPG development process, allowing any relevant papers published before 2 July 2025 to be included. Future CPG updates will consider evidence published after this cut-off date. Full details of the search strategy can be obtained from the CPG Secretariat.

## **EVIDENCE APPRAISAL AND FORMULATION OF RECOMMENDATIONS**

All retrieved literature was appraised by at least two DG members using the Critical Appraisal Skills Programme (CASP) and Risk of Bias (RoB) checklists presented in evidence tables and discussed at DG meetings. Statements and recommendations were agreed upon by both the DG and RC. Where evidence was insufficient, the recommendations were made by consensus of the two groups. The CPG is largely based on systematic reviews, meta-analyses and clinical trials, with local practice taken into consideration.

**Levels/ Grades:** Individual studies were graded using the U.S. Preventive Services Task Force (2015) levels of evidence; recommendation strength followed GRADE principles. The writing of the CPG adheres to AGREE II requirements.

## LEVELS OF EVIDENCE

Level	Study design
I	Properly powered and conducted randomised controlled trial; well-conducted systematic review or meta-analysis of homogeneous randomised controlled trials
II-1	Well-designed controlled trial without randomisation
II-2	Well-designed cohort or case-control analysis study
II-3	Multiple time series, with or without the intervention; results from uncontrolled studies that yield results of large magnitude
III	Opinions of respected authorities, based on clinical experience; descriptive studies or case reports; reports of expert committees

**SOURCE:** U.S. Preventive Services Task Force. U.S. Preventive Services Task Force Procedure Manual. Rockville, MD: USPSTF; 2015.

### FORMULATION OF RECOMMENDATION

- In line with the new development in CPG methodology, the CPG Unit of MaHTAS is adapting **Grading Recommendations, Assessment, Development and Evaluation (GRADE)** in its work process. The quality of body of evidence and related effect size are carefully assessed/reviewed by the CPG Development Group (DG).
- Recommendations are formulated based on **certainty of evidence** and the wording used denotes the **strength of recommendations**. This takes into account:
  - quality and level of the evidence
  - balance of benefits and harms of the options
  - patient's preference and values
  - resource implications
  - relevancy and applicability to the local target population
- The more criteria being fulfilled, the more certain is the evidence leading to strong recommendations using the word **“should”** being considered. Otherwise, weak recommendations use the word **“may”** in proposing an action to be made.
- In the CPG, a yellow box  highlights important message(s) in the management while a blue box  contains evidence-based recommendation(s) for the particular condition.

### USE OF EXISTING GUIDELINES AND QUALITY APPRAISAL

References were also made to other guidelines on Foreign Body Ingestion in Children as listed below:

- i. The North American Society of Paediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN) Endoscopic Committee
- ii. The European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) and European Society of Gastrointestinal Endoscopy (ESGE)
- iii. The Italian Society of Paediatric Gastroenterology, Hepatology and Nutrition (SIGENP) and The Italian Association of Hospital Gastroenterologists and Endoscopists (AIGO)
- iv. The American Society for Gastrointestinal Endoscopy (ASGE)

The evidence-based CPGs were evaluated using the Appraisal of Guidelines for Research and Evaluation (AGREE) II prior to them being used as references.

## **EXTERNAL REVIEW, PUBLIC CONSULTATION & APPROVAL**

The draft on completion underwent external peer review and was posted on the MOH Malaysia website for public consultation ( $\geq 30$  days). The draft was then presented to the Technical Advisory Committee for CPG and the HTA & CPG Council, MOH Malaysia for review and approval. Further details on the CPG development methodology by MaHTAS are available in the Manual on Development and Implementation of Evidence-based Clinical Practice Guidelines.

(available at: [https://www.moh.gov.my/moh/resources/CPG\\_MANUAL\\_MAHTAS.pdf](https://www.moh.gov.my/moh/resources/CPG_MANUAL_MAHTAS.pdf))

## **IMPLEMENTATION, AUDIT & MONITORING** (*Detailed out in Chapter 8*)

Priority recommendations include audit indicators (numerator/denominator, target, data source, suggested frequency) to enable quality improvement and monitoring.

## **UPDATING POLICY**

These guidelines were issued in 2025 and will be reviewed in a minimum period of four years (2029) or sooner if new evidence warrants earlier revision. When it is due for updating, the Chairperson of the CPG or National Advisor of the related specialty will be informed about it. A discussion will be done on the need for a revision including the scope of the revised CPG. A multidisciplinary team will be formed and the latest systematic review methodology used by MaHTAS will be employed. Every care is taken to ensure that this publication is correct in every detail at the time of publication. However, in the event of errors or omissions, corrections will be published in the web version of this document, which will be the definitive version at all time. This version can be found on the websites mentioned above.

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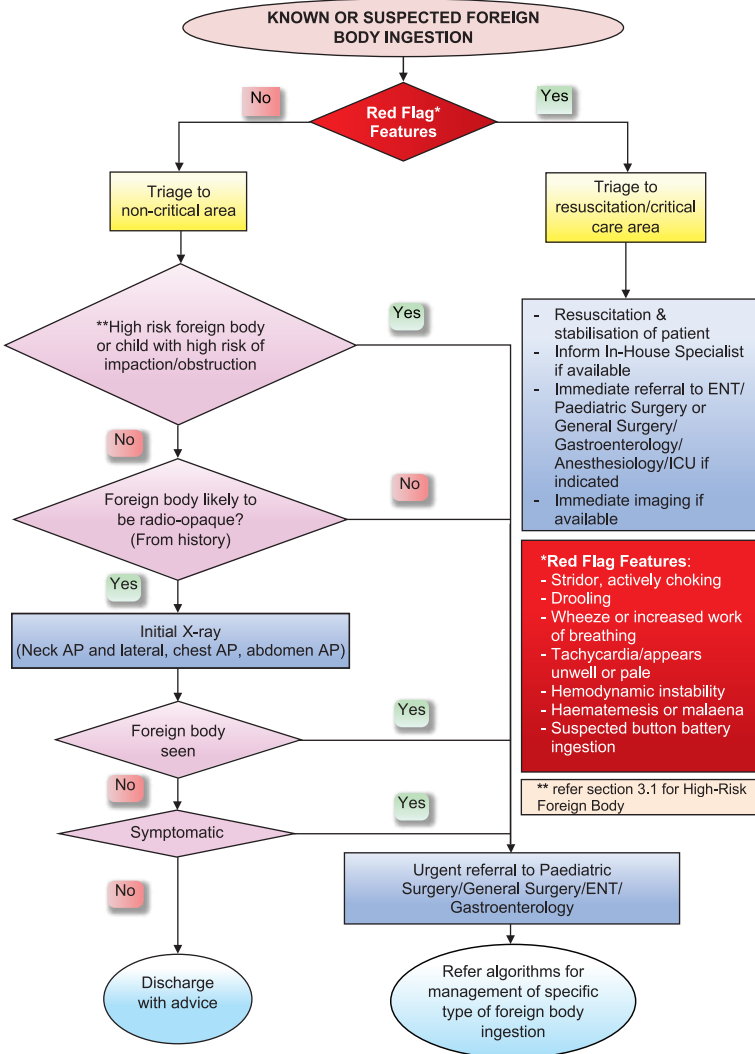
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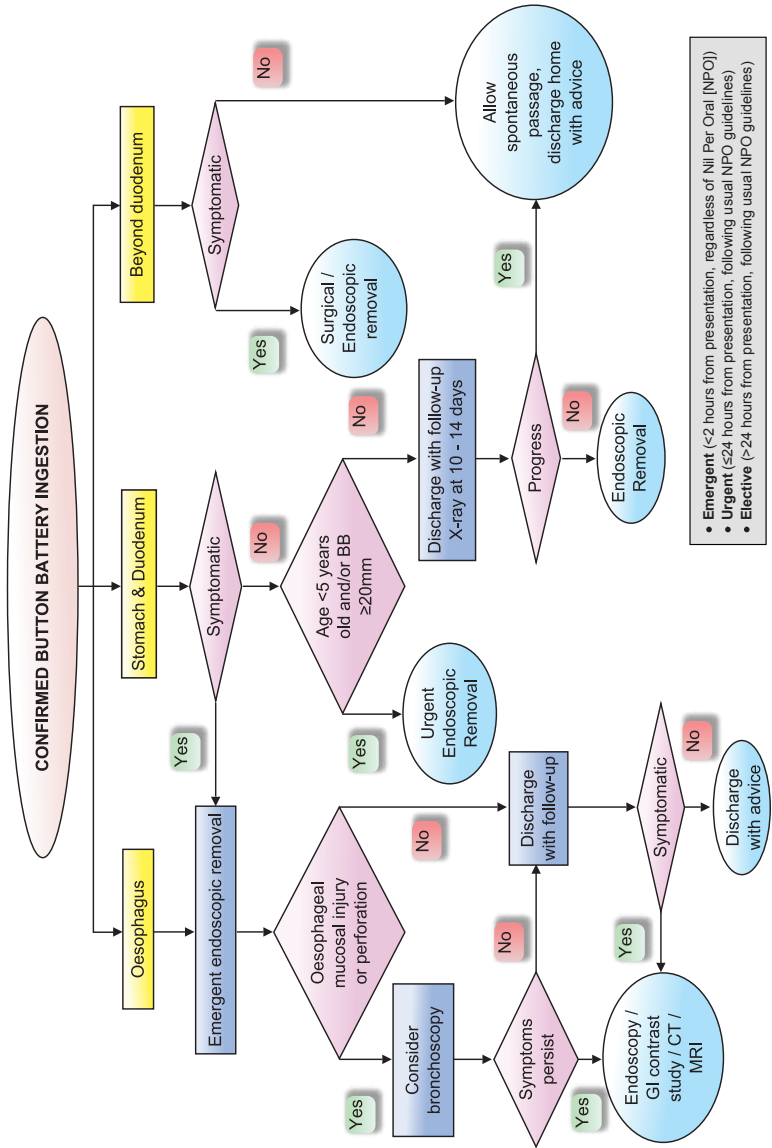
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## ALGORITHM 1: INITIAL MANAGEMENT OF FOREIGN BODY INGESTION IN CHILDREN

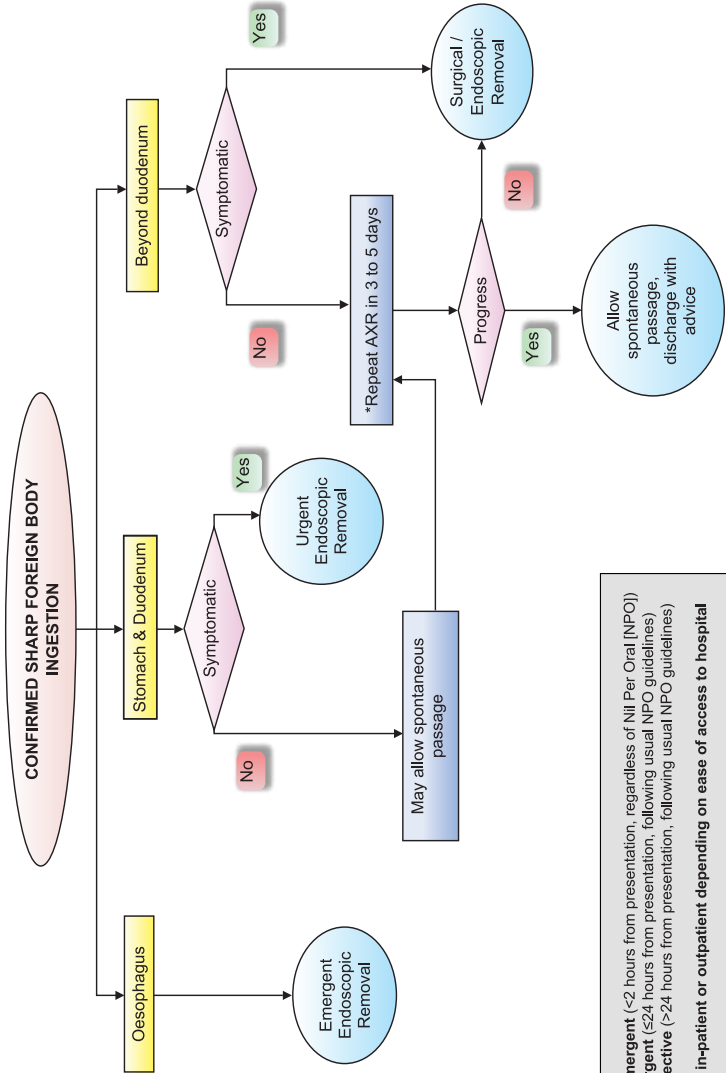


**ALGORITHM 2: MANAGEMENT OF BUTTON BATTERY INGESTION IN CHILDREN**



- **Emergent** (<2 hours from presentation, regardless of Nil Per Oral [NPO])
- **Urgent** (≤24 hours from presentation, following usual NPO guidelines)
- **Elective** (>24 hours from presentation, following usual NPO guidelines)

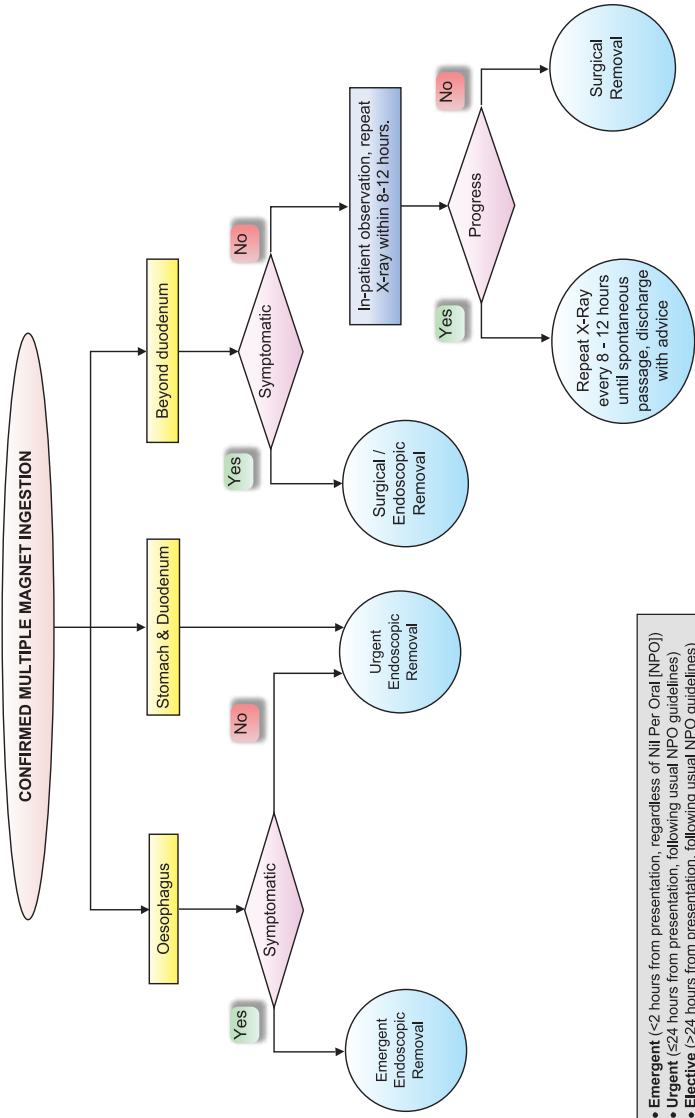
**ALGORITHM 3: MANAGEMENT OF SHARP FOREIGN BODY INGESTION IN CHILDREN**



- **Emergent** (<2 hours from presentation, regardless of Nil Per Oral [NPO])
- **Urgent** (≤24 hours from presentation, following usual NPO guidelines)
- **Elective** (>24 hours from presentation, following usual NPO guidelines)

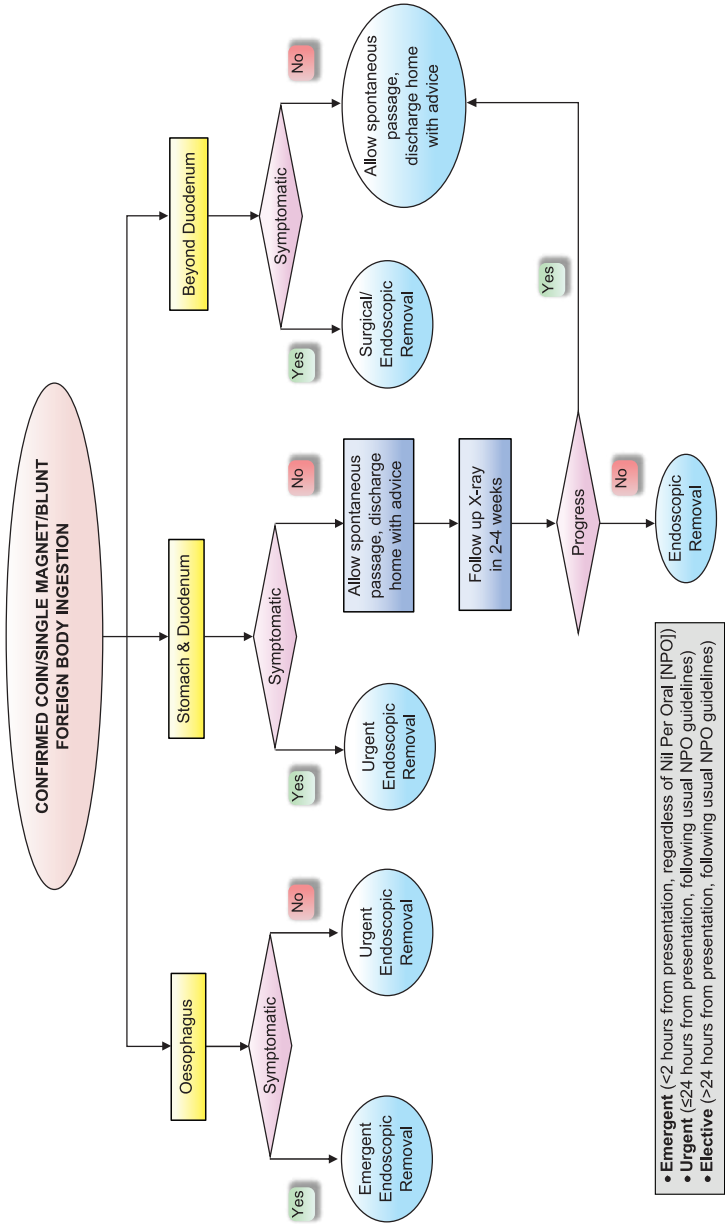
\*As in-patient or outpatient depending on ease of access to hospital

**ALGORITHM 4: MANAGEMENT OF MULTIPLE MAGNET INGESTION IN CHILDREN**



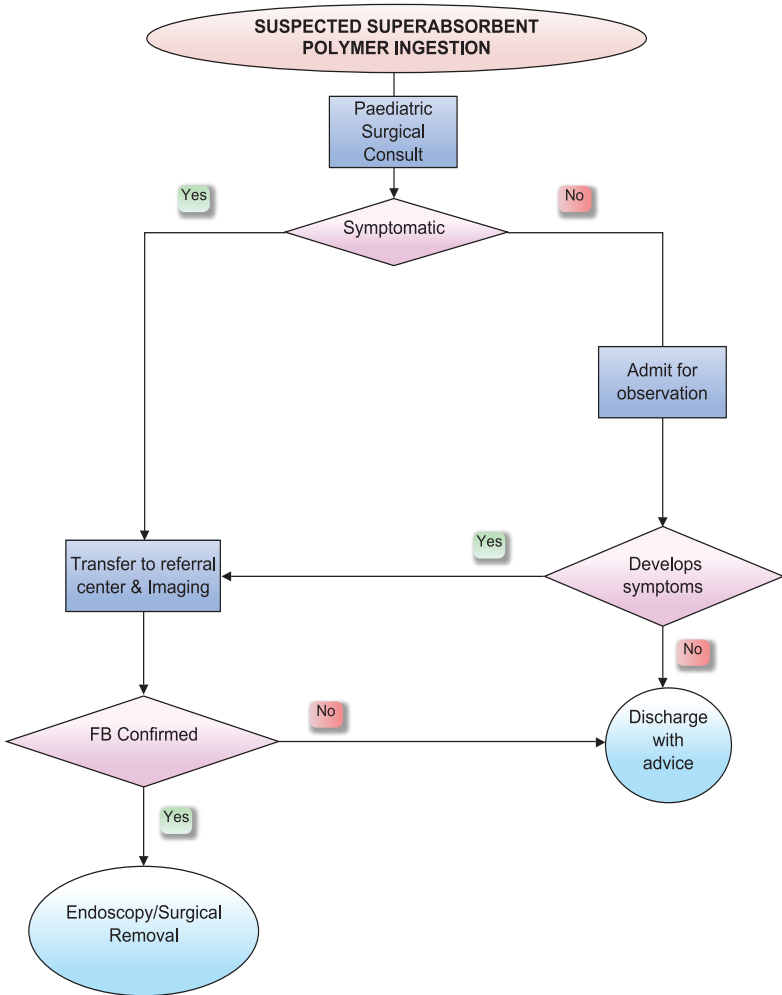
- **Emergent** (<2 hours from presentation, regardless of Nil Per Oral [NPO])
- **Urgent** (≤24 hours from presentation, following usual NPO guidelines)
- **Elective** (>24 hours from presentation, following usual NPO guidelines)

**ALGORITHM 5: MANAGEMENT OF COIN/CYLINDRICAL BATTERY/SINGLE MAGNET/BLUNT FOREIGN BODY INGESTION IN CHILDREN**



- **Emergent** (<2 hours from presentation, regardless of Nil Per Oral [NPO])
- **Urgent** (≤24 hours from presentation, following usual NPO guidelines)
- **Elective** (>24 hours from presentation, following usual NPO guidelines)

## ALGORITHM 6: MANAGEMENT OF SUPERABSORBENT POLYMER INGESTION IN CHILDREN



- **Emergent** (<2 hours from presentation, regardless of Nil Per Oral [NPO])
- **Urgent** (≤24 hours from presentation, following usual NPO guidelines)
- **Elective** (>24 hours from presentation, following usual NPO guidelines)

## 1. INTRODUCTION

Foreign body ingestion refers to the act of swallowing non-food items that subsequently enter the gastrointestinal (GI) tract. Although the term may also apply to edible items that become lodged before reaching the stomach.<sup>1</sup> this guideline focuses on non-edible objects, including button batteries, sharp objects, magnets, coins/blunt objects and superabsorbent polymer (SAP) objects

Foreign body ingestion is a common occurrence in children, particularly between the ages of six months and three years. Over 50,000 cases of foreign body ingestion in children younger than five years were reported to the National Poison Data System.<sup>2</sup> Children with intellectual disabilities or underlying anatomical GI abnormalities are at increased risk, and the ingestion event can present as a medical emergency, depending on the nature and location of the foreign body.

Notably, 80 - 90% of foreign bodies in the GI tract are passed spontaneously without complications, 10 - 20% require endoscopic removal. Approximately, 1% necessitate surgical intervention due to complications such as bowel obstruction, perforation, haemorrhage, abscess formation, septicemia, or fistula formation.<sup>3, level III</sup>

Among the current challenges faced are the variations in managing foreign body ingestion amongst specialties, mainly concerning:

- referral pathways, based on the availability of expertise and equipment
- duration of observation and follow-up for patients managed conservatively
- timing of intervention for high-risk cases involving objects with greater potential for harm

Currently, most treatment strategies are adapted from guidelines such as those from:

- The North American Society for Paediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN)
- The European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN)
- The U.S. National Capital Poison Center
- The Italian Society of Paediatric Gastroenterology, Hepatology and Nutrition (SIGENP) and The Italian Association of Hospital Gastroenterologists and Endoscopists (AIGO)

Despite the availability of international protocols, there remains a lack of local, standardised, evidence-based guidance in Malaysia. This CPG seeks to address that gap by providing recommendations grounded

in current, high-quality evidence to support best practices in the management of foreign body ingestion in children.

This Clinical Practice Guideline (CPG) is intended for use across all levels of healthcare from primary, secondary to tertiary. It also serves as a valuable resource for those involved in surgical training. It is hoped that this guideline will support healthcare providers in delivering timely, consistent, and effective management of paediatric foreign body ingestion, ultimately improving patient outcomes.

## 2. TRIAGE

Paediatric patients with foreign body ingestion may present to the primary care or Emergency Department (ED) with either witnessed or unwitnessed foreign body ingestion. Healthcare providers play a key role to identify this group of patients to institute appropriate initial assessment and timely referral to the relevant facilities for subsequent management.

In the Ministry of Health's Malaysian Triage Scale Protocol, rapid assessment of paediatric patients in ED should be performed using the Paediatric Assessment Triangle (PAT) in which the following are recommended:<sup>4, level III</sup>

- any children with danger signs must be moved to resuscitation, immediate emergency care or urgent attention
- children without danger signs should proceed to registration and secondary triage
- children should not be routinely triaged away

Refer to **Appendix 3** for **Paediatric Danger Signs and Triage Levels**.

Depending on clinical history and symptom severity, patients with potential foreign body ingestion should be categorised into the following triage levels:<sup>5, level III</sup>

- critical: drooling, stridor, hemodynamic instability or suspicious to have ingested button battery
- acute: tachypnoea, wheezing, chest wall recession, tachycardia, dysphagia or chest pain
- urgent: history of choking episodes but are now back to baseline

Life-threatening foreign body ingestion should be suspected when a patient exhibits the following red flag features:<sup>6, (level III)</sup>

- stridor, actively choking
- wheeze or increased work of breathing
- tachycardia, appears unwell or pale
- haematemesis or malaena

Triage is an important factor to determine the timing of endoscopy. The North American Society of Paediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN) Endoscopic Committee recommends the timing\* of endoscopy in children with foreign body ingestion based on several factors including:<sup>7, level III</sup>

- clinical status of the child
- time of the child's last oral intake
- type of foreign body ingestion
- location within the gastrointestinal tract

\*timing can be divided into categories of -

- emergent (<2 hours from presentation, regardless of Nil Per Oral [NPO])
- urgent (≤24 hours from presentation, following usual NPO guidelines)
- elective (>24 hours from presentation, following usual NPO guidelines)

Most button battery ingestions are not witnessed. The possibility of such ingestion should be considered in every patient with the following symptoms:<sup>8, level III</sup>

- wheezing or other noisy breathing
- drooling
- vomiting
- chest pain or discomfort
- abdominal pain
- difficulty swallowing
- decreased appetite or refusal to eat
- coughing, choking or gagging with eating or drinking

Based on the evidences, the DG opines that the danger signs in foreign body ingestions could be stratified as follows:

- critical: drooling, stridor, hemodynamic instability, or suspected button battery ingestion.
- acute: tachypnoea, wheezing, chest wall recession, tachycardia, dysphagia or chest pain.
- urgent: history of choking episodes now back to baseline.

### **Recommendation 1**

- Triage should be performed in all children with suspected foreign body ingestion.
  - Danger signs should be identified to determine the triage categories

### 3. DIAGNOSIS AND ASSESSMENT

Accurate and timely assessment is essential in managing suspected foreign body ingestion in children. This section discusses clinical assessments and the imaging modalities that are essential to be carried out.

#### 3.1 Clinical Assessment

Clinical assessment should include patient information such as age, associated conditions, type of foreign body, clinical symptoms and results of physical examination.

A large multicentre cross-sectional study of 5,800 children with foreign body ingestion evaluated the association between clinical features and the likelihood of requiring surgical or endoscopic intervention. Key findings identified based on history and presentation were:<sup>9, level III</sup>

- type of foreign body:
  - button batteries have significantly higher odds of requiring intervention compared to blunt objects (OR=4.89, 95% CI 3.89 to 6.16)
  - magnets presented an increased risk (OR=2.61, 95% CI 1.40 to 4.66)
  - sharp-pointed objects moderately increased risk (OR=1.65, 95% CI 1.36 to 1.99)
  - unknown object types were similar to blunt objects
  - patients with pre-existing medical conditions had higher likelihood (OR=3.42, 95% CI 2.57 to 4.53)
- the symptoms with the highest likelihood of intervention were:
  - drooling (OR=13.9, 95% CI 11.1 to 17.4)
  - dysphagia (OR=10.6, 95% CI 8.0 to 14.3)
  - food refusal (OR=6.5, 95% CI 4.3 to 9.8)
  - retrosternal pain (OR=5.9, 95% CI 4.3 to 8.3)

Children who ingest foreign bodies may present with a range of symptoms or may be completely asymptomatic. The most common presenting symptoms include:<sup>10, level III; 11, level III; 12, level III</sup>

- respiratory symptoms
  - gagging
  - choking
  - coughing
- gastrointestinal symptoms
  - vomiting
  - drooling
  - dysphagia
  - odynophagia
  - globus sensation (foreign body sensation)
- being completely asymptomatic

- for those who are unable to provide reliable history (younger patients and those with mental impairment) presenting with the above symptoms, it is important to suspect oesophageal foreign body ingestion

On physical examination:

- often normal in many cases
- fever
- stridor or noisy breathing
- hypoxaemia, tachycardia and hypertension may suggest prolonged, complete oesophageal obstruction
- neck swelling, tenderness, erythema or crepitus may suggest oropharyngeal or proximal oesophageal perforation
- tenderness in the abdomen, chest or throat
- peritonitis and signs of systemic illness may suggest distal oesophageal rupture

According to the Royal Children's Hospital Melbourne Guideline, the red flags in foreign body ingestion in children include:<sup>13, level III; 14, level III</sup>

- **high-risk foreign bodies:**
  - button battery lodged in oesophagus
  - magnet + metal object or >1 magnet
  - sharp objects in the oesophagus e.g. fish bone, pins or needles
  - lead-based objects that fail to transit through the stomach
  - large objects (>60 mm long and/or >20 mm wide)
  - expandable foreign bodies e.g. superabsorbent polymers (water beads, expandable toys)
  - multi-component objects e.g. toys with lights, motors and batteries
  - objects impacted in the oropharynx require urgent ENT evaluation
- **children with a higher risk of impaction/obstruction** include those with:
  - pre-existing gastrointestinal tract abnormalities (e.g. strictures) or congenital malformations (repaired or unrepaired)
  - eosinophilic oesophagitis
  - neuromuscular disease

In another large cross-sectional study on paediatric cases of foreign body ingestion found that the frequency of clinical symptoms were strongly associated with the anatomical location of the foreign body within the gastrointestinal tract (GIT):<sup>15, level III</sup>

- frequency of symptoms
  - were significantly more in an oesophageal position (83.9%)
  - were less frequent if distal to the flexura duodenojejunalis (8.21%)

### 3.2 Imaging Modalities

Imaging plays a central role in the diagnosis, triage, and management of suspected foreign body ingestion in children. The choice of imaging modality depends on several factors, including the suspected type, anatomical location, and radiographic properties of the foreign body (i.e. radiopaque vs. radiolucent), as well as the clinical presentation and the risk of complications.

Timely and appropriate imaging ensures prompt and accurate diagnosis, enables effective decision-making and reduces the risk of morbidity and mortality associated with delayed or missed diagnosis.

A diagnostic study on children with coin ingestion showed that a single frontal/AP chest radiograph (CXR) encompassing the entire length of the oesophagus was sufficient as the initial investigation of children presenting with a clear history of coin ingestion. The diagnostic modality showed a sensitivity of 95.2% and specificity of 97.8% against the gold standard of subsequent interventions.<sup>16, level III</sup>

In another diagnostic study, the combined accuracy of clinical history and radiographic findings of disc-shaped oesophageal foreign body ingestion in children as predictors for coin or button batteries, reported:<sup>17, level III</sup>

- in button battery ingestion, the sensitivity neared 100% and the specificity neared 40%
- in coin ingestion, the sensitivity was 98.2% and the specificity neared 100%

In a diagnostic study on the overall sensitivity of CXR in detecting paediatric foreign body ingestion was found to vary depending on object type:<sup>11, level III</sup>

- 100% for coins
- 56% for non-coin foreign bodies
  - 80% for non-coin metallic objects
  - 33% for fish and chicken bones

In a consensus guideline on ingestion of super strong\* magnets in children, the following were recommended:<sup>18, level III</sup>

- chest and abdominal radiographs [in supine anteroposterior (AP) view] to assess both the number and location of magnets
- in case of a single magnet being identified on frontal/AP view abdominal radiograph (AXR), a lateral view should also be requested to confirm that only a single magnet was ingested
- all patients considered suitable for discharge after rare earth magnet ingestion require follow-up AXR after 6 - 12 hours (only repeat CXR if magnets are seen in chest on first image)
- failure of the magnet to progress through the GIT (after a period of 6 - 12 hours confirmed by a radiologist) warrants an immediate discussion with a paediatric surgeon

(\*Rare earth magnets are between five and ten times stronger than ceramic magnets and are sometimes called 'super strong' or powerful magnets).

A cross-sectional study to evaluate the value of radiologic signs in detecting oesophageal foreign bodies in children showed pre-operative radiologic evaluation had an overall detection of 53.7%.<sup>19, level III</sup>

Another cross-sectional study on radiographic and endoscopic characteristics in paediatrics patients with foreign body ingestion:<sup>20, level III</sup>

- most frequently performed projection was AP of the chest and abdominal (43.5%), which provided valuable information as to the location and characteristics of the foreign body
- endoscopic location coincided with radiographic location in the majority of cases (90.9%)

In an evidence-based guideline on paediatric gastrointestinal endoscopy by the European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) and European Society of Gastrointestinal Endoscopy (ESGE), the imaging proposed for foreign body ingestion were as follows:<sup>21</sup>

- radiographic evaluation in all patients with suspected foreign body ingestion even if asymptomatic
- biplane radiographs (both frontal/AP and lateral views) of the neck, chest, abdomen and pelvis if indicated
- computed tomography (CT) scan may be considered in cases of suspected radiolucent foreign bodies
- button battery >20 mm in the stomach should be evaluated by radiograph and removal is indicated if the battery remains in place beyond 48 hours post-ingestion
- a single cylindrical battery in the stomach and the child remains asymptomatic, outpatient monitoring is acceptable. If not passed in stool, radiographic evaluation should be done after 7 to 14 days post-ingestion.

The ESPGHAN guideline emphasises the following imaging strategies in the diagnosis, management, and follow-up of paediatric button battery ingestion:<sup>22</sup>

- two-view (AP and lateral) radiographs are paramount to diagnose button battery ingestion and confirm its location; the radiograph must include the entire neck, chest and abdomen to ensure no button battery is missed
- follow-up radiograph after 7 - 14 days for asymptomatic button battery ingestion that has passed beyond oesophagus unless the battery has been noticed in stools by the parents
- (serial) magnetic resonance imaging (MRI) and CT scans are necessary to detect complications in patients with significant injury and/or delayed removal of button battery
- oesophagogram to be performed in all patients with mucosal injury one to two days after button battery removal to look for signs of perforation before starting a clear liquid diet
- contrast oesophagograms and/or repeat endoscopies are necessary for long-term follow-up in patients with oesophageal injury to detect stricture formation, which can occur weeks after the incident

The NASPGHAN consensus guideline on management of foreign body ingestion in children recommends the following imaging based on type of foreign body,<sup>7</sup> (level III)

TYPE OF FOREIGN BODY	IMAGING RECOMMENDATION			
	PLAIN X-RAY	FLUOROSCOPY	ULTRASONOGRAPHY (USG)	CT/MRI
Button battery (BB) in oesophagus	<ul style="list-style-type: none"> <li>• AP view: "double halo" sign (<b>Figure 1</b>)</li> <li>• Lateral view: "step-off" sign (help distinguish a BB from regular coins) (<b>Figure 1</b>)</li> </ul>	<ul style="list-style-type: none"> <li>• Oesophagogram: to exclude oesophageal leak before advancing diet in proven oesophageal injury on endoscopy</li> </ul>	<ul style="list-style-type: none"> <li>• Not-applicable</li> </ul>	<ul style="list-style-type: none"> <li>• CT angiography: to exclude aortic injury if injury seen at level of aorta on endoscopy</li> <li>• MRI chest: to assess injury to surrounding tissue or proximity to aorta</li> </ul>
BB within gastric and beyond	<p>If &lt;5 yrs old and BB <math>\geq</math>20 mm</p> <ul style="list-style-type: none"> <li>• not for repeat plain radiograph (suggest for endoscopic removal)</li> </ul> <p>If <math>\geq</math>5 yrs old and BB &gt;20 mm</p> <ul style="list-style-type: none"> <li>• repeat X-ray in 48 hours</li> </ul> <p>If <math>\geq</math>5 yrs old and BB &lt;20 mm</p> <ul style="list-style-type: none"> <li>• repeat at 10 - 14 days</li> </ul>	<ul style="list-style-type: none"> <li>• Not-applicable</li> </ul>	<ul style="list-style-type: none"> <li>• Not-applicable</li> </ul>	<ul style="list-style-type: none"> <li>• Not-applicable</li> </ul>

IMAGING RECOMMENDATION				
TYPE OF FOREIGN BODY	PLAIN X-RAY	FLUOROSCOPY	ULTRASONOGRAPHY (USG)	CT/MRI
Magnet	<ul style="list-style-type: none"> <li>• CXR/AXR frontal/AP view: to confirm magnet ingestion</li> <li>• AXR lateral view: only if suspected multiple magnets but seen as single on AXR frontal/AP view</li> <li>• Serial X-ray (4 - 6 hours): for multiple magnet plan for conservative management (asymptomatic/no perforation at diagnosis) to assess passage (<b>Figure 4 &amp; 5</b>)</li> </ul>	<ul style="list-style-type: none"> <li>• Not-applicable</li> </ul>	<ul style="list-style-type: none"> <li>• Not-applicable</li> </ul>	<ul style="list-style-type: none"> <li>• Not-applicable</li> </ul>
Sharp objects	<ul style="list-style-type: none"> <li>• PPV of radiographs is 100% for metallic objects (but lower for radiolucent object e.g., glass/bones/wood)</li> <li>• In conservative management for radio-opaque FB beyond duodenum, for daily AXR (may consider surgical removal if no progression in 3 days) (<b>Figure 6</b>)</li> </ul>	<ul style="list-style-type: none"> <li>• Upper GI contrast study may be considered for radiolucent FB if X-ray is negative and suspicion of FB remains high</li> </ul>	<ul style="list-style-type: none"> <li>• USG abdomen: may be considered for radiolucent FB if X-ray is negative and suspicion of FB remains high</li> </ul>	<ul style="list-style-type: none"> <li>• CT/MRI: may be considered for radiolucent FB if X-ray is negative and suspicion of FB remains high</li> </ul>

TYPE OF FOREIGN BODY	IMAGING RECOMMENDATION			
	PLAIN X-RAY	FLUOROSCOPY	ULTRASONOGRAPHY (USG)	CT/MRI
Coins and other blunt objects	<ul style="list-style-type: none"> <li>• FB series of radiographs (CXR/neck x-ray/AXR) to identify the presence and location of any coins</li> <li>• Lateral films are extremely helpful in differentiating the “step-off” of a button battery that will discriminate it from a coin (<b>Figure 2</b>)</li> </ul>	<ul style="list-style-type: none"> <li>• Not-applicable</li> </ul>	<ul style="list-style-type: none"> <li>• Not-applicable</li> </ul>	<ul style="list-style-type: none"> <li>• Not-applicable</li> </ul>
Superabsorbent polymer (SAP) objects	<ul style="list-style-type: none"> <li>• Unlikely to be helpful (radiolucent) (<b>Figure 3</b>)</li> </ul>	<ul style="list-style-type: none"> <li>• GI contrast studies could potentially identify areas of obstruction, but are likely to delay or complicate plans for endoscopic removal</li> </ul>	<ul style="list-style-type: none"> <li>• Not-applicable</li> </ul>	<ul style="list-style-type: none"> <li>• Not-applicable</li> </ul>

A single-centre cross-sectional study on the benefits of routine post-operative chest radiographs after removal of oesophageal foreign body in children, showed:<sup>23, level III</sup>

- no injuries were identified on routine post-oesophagoscopy chest radiographs as there will be direct visualisation of injury during oesophagoscope
- patients with operative findings concerning an oesophageal injury were more likely to have an injury confirmed on oesophagram (8.5% vs 0%, p=0.0001)

Another cross-sectional study demonstrated the potential value of water-filled stomach ultrasonography, as a radiation-free imaging modality in the diagnostic workup of swallowed foreign bodies in children, especially radiolucent ones that may not be visible on conventional radiographs.<sup>24, level III</sup>

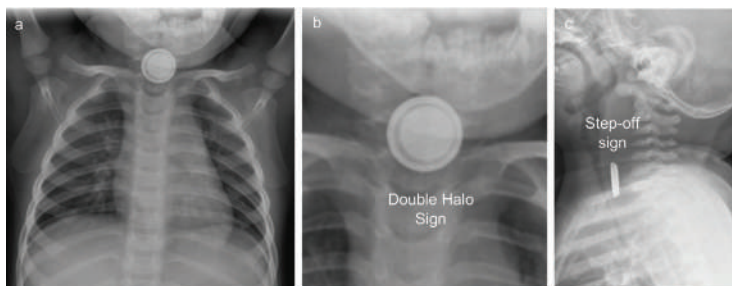
The DG opines that the following imaging modalities should be done based on the type of foreign body ingestion in children.

Suspected Type of Foreign Body	Suspected Type of Foreign Body
Button battery in chest	Plain Chest X-ray (AP & lateral)
Button battery in abdomen	Plain Abdominal X-ray (AP supine)
Magnets	Serial Plain X-rays: <ul style="list-style-type: none"> <li>• Chest: CXR-AP</li> <li>• Abdomen: AXR- AP &amp; lateral</li> </ul>
Sharp objects	<u>Radiopaque:</u> Plain X-ray  <u>Radiolucent:</u> USG abdomen Upper GI contrast study/CT/MRI
Coins/Blunt objects	Serial Plain X-rays
Superabsorbent polymer objects	Plain Abdominal X-ray / USG

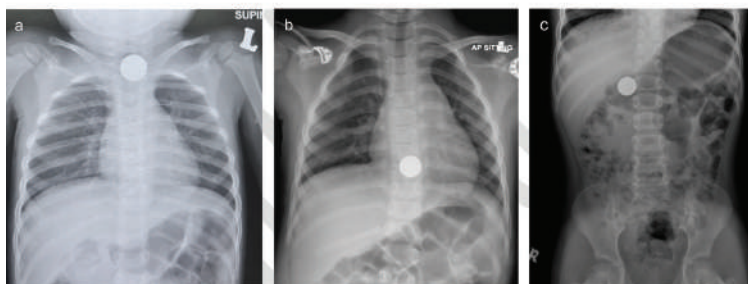
### Recommendation 2

- Plain radiographs should be the first-line imaging modality for most foreign body ingestion in children.
- Abdominal ultrasonography should be done for superabsorbent polymer objects and any sharp radiolucent object ingestion in children.
- Gastrointestinal (GI) contrast study and computed tomography scan (CT)/magnetic resonance imaging (MRI) should be done for suspected sharp radiolucent objects and complications of foreign body ingestion in children.

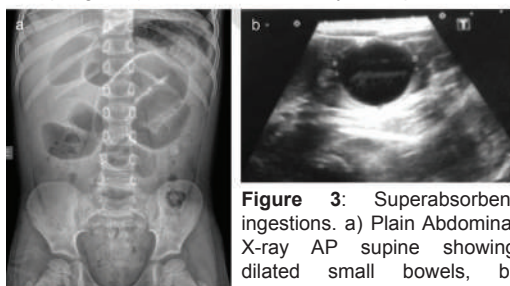
## RADIOGRAPHIC FEATURES OF FOREIGN BODY INGESTION IN CHILDREN



**Figure 1:** Plain Chest X-ray showing (a) AP view button battery in upper oesophagus, (b) AP view with “double halo” sign and (c) Lateral view with “step-off” sign.



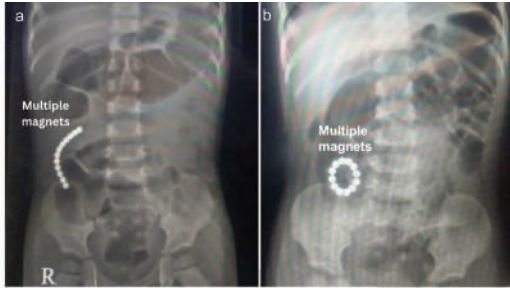
**Figure 2:** Absence of “double halo” sign in a) Plain Chest X-ray AP view showing coin in the upper oesophagus, b) Plain Chest X-ray AP view showing coin in the lower oesophagus, c) Plain Abdominal X-ray AP supine showing coin in the stomach.



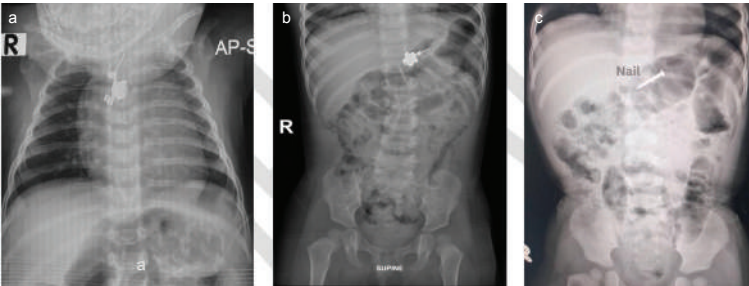
**Figure 3:** Superabsorbent ingestions. a) Plain Abdominal X-ray AP supine showing dilated small bowels, b) Abdominal USG showing anechoic rounded mass with posterior shadowing which represent jelly ball.



**Figure 4:** Plain abdominal X-ray AP supine showing double magnets in the stomach.



**Figure 5:** Plain abdominal X-ray AP supine showing multiple magnets in the bowel. (a) within bowel lumen in a linear arrangement, (b) 6 hours later, the magnets appear clustered together in a ring pattern suggestive of entero-enteral fistula formation.



**Figure 6:** Sharp objects ingestion. a) Plain Chest X-ray AP view showing brooch in the upper oesophagus, b) Plain Abdominal X-ray AP supine showing brooch in the stomach, c) Plain Abdominal X-ray AP supine in showing nail in the large bowel.

## 4. REFERRAL

Primary care providers often face a dilemma regarding referral and admission decisions for foreign body ingestions in children. These include determining the type and location of the foreign body, referral to the appropriate specialty, the timing, and the appropriate level of healthcare facility.

- There is no high quality or retrievable evidence on the indications for referral of foreign body ingestion in children. Thus, the CPG DG opines that the indications for consultations/referrals include:
  - symptomatic foreign body ingestion
  - suspected/unwitnessed foreign body ingestion
  - all suspected or confirmed button battery ingestion
  - failure of foreign body passage on follow-up
  - complications resulting from foreign body ingestion
- Referral decisions need to be made to the appropriate specialty based on the availability of the resources at local settings.
- In cases suspected child abuse / criminal intent, referral to SCAN (Suspected Child Abuse and Neglect) or OSCC (One Stop Crisis Centre) is required.

### 4.1 Admission

The following criteria based on evidence, outline situations in children with foreign body ingestion requiring immediate admission or admission for observation;<sup>7; 13; 25, level III</sup>

Those requiring immediate admission include:

- Symptomatic children
- Evidence of complication (perforation, obstruction, bleeding, or suspected airway involvement)
- Foreign body lodged in the oesophagus
- Multiple magnets, or a magnet plus another metallic object
- Sharp objects
- Large objects unlikely to pass pylorus (diameter > 2 - 2.5 cm, length > 5 - 6 cm in children)

Admission for observation include:

- Foreign body beyond oesophagus but not yet passed the stomach, especially if large or irregularly shaped
- Unknown type of object or uncertain time of ingestion
- Lack of radiographic progression after 24 - 48 hours
- Children with previous GI surgery or anatomical abnormalities (e.g., strictures, congenital malformations)
- Multiple foreign bodies of uncertain type

- Any ingested object with potential chemical hazard (e.g., batteries that may leak, metallic items containing lead)

- Children with foreign body ingestion should be admitted and considered for intervention if any of the following apply:
  - symptomatic
  - foreign body in the oesophagus
  - multiple magnet ingestion
  - confirmed ingestion of superabsorbent polymer objects

## 5. TREATMENT

Foreign body ingestion in children spans a spectrum from benign, self-limiting events to rapidly progressive, life-threatening emergencies. Although 80 to 90% of ingested objects pass spontaneously, roughly 10 to 20% need endoscopic removal and about 1% mandate operative intervention because of obstruction, perforation, haemorrhage or fistula formation (**Figure 7 to 11**).<sup>3, level III</sup> Consequently, treatment decisions must balance the high likelihood of uneventful passage against the small but significant risk of catastrophic harm.<sup>3, level III</sup>

This section is structured around three pillars:

- i. Risk stratification by object type, anatomical location, and patient symptoms
- ii. Time-critical response windows (emergent <2 hours, urgent ≤24 hours, elective >24 hours)
- iii. A step-up management ladder progressing from adjunct measures to observation, endoscopic retrieval and surgery when required

Together, these tiers provide a practical roadmap for clinicians to match intervention urgency and invasiveness to the specific hazards each case presents.

### 5.1 Adjunct Treatment

Honey has been suggested as a mitigation strategy to reduce oesophageal injury in button battery ingestion.<sup>22</sup>

ESPGHAN guideline recommends the use of honey in button battery ingestion in children as follows:<sup>22</sup>

- mitigation strategies using honey can be considered in specific cases while waiting for endoscopy
- the administration of honey should not delay the referral or transfer of the patient
- honey should be administered in 10 mL doses (2 teaspoons) every 10 minutes with a maximum of six doses

The indications to administer honey immediately (provided it is readily available) in button battery ingestion in children are:<sup>8, level III</sup>

- a lithium button battery may have been ingested (if unknown type, assume it is a lithium button battery unless it is a hearing aid battery)
- child is ≥12 months of age
- battery has been swallowed within 12 hours
- child is able to swallow

## 5.2 Conservative Management

Conservative management refers to an inpatient 'watch-and-wait' approach while awaiting definitive intervention, is often the initial approach for asymptomatic foreign body ingestion in children passed beyond the stomach. Key considerations include:<sup>7, level III</sup>

- **Multiple magnet ingestion:** If serial imaging in the ED shows no progression, repeat imaging is recommended within 8 - 12 hours after admission
- **Sharp object ingestion:** Daily abdominal X-ray may be considered for up to 3 days to monitor for movement or complications
- **Button battery ingestion:** Hospital admission should be considered for patients who face difficulties accessing healthcare facilities

A case series demonstrated that most children who ingested cylindrical batteries remained asymptomatic, with markedly fewer mucosal injuries compared to button battery ingestion. Findings from both clinical experience and the reviewed literature indicate that asymptomatic patients without abdominal complaints or evidence of battery casing damage can be managed conservatively with close monitoring and radiologic imaging. Non-urgent endoscopic retrieval may be considered if the cylindrical battery remains accessible endoscopically. However, the presence of prior abdominal surgery, a damaged or leaking battery, or any clinical symptoms should prompt urgent endoscopy for removal, or surgical consultation if the battery has migrated beyond endoscopic reach.<sup>26, level III</sup>

In a single centre cohort study of 139 children who experienced spontaneous passage following foreign body ingestion found that:<sup>26, level III</sup>

- most common foreign body ingested were blunt objects (60%), in which coin was the commonest type (40%)
- most children were asymptomatic (88%)
- among symptomatic children, 13 (9%) had abdominal pain, of which 10 ingested sharp objects ( $p=0.006$ )
- among the 130 patients with spontaneous passage:
  - mean transit time was  $119 \pm 105$  hours (4 - 5 days)
  - sharp objects experienced quicker passage compared to blunt objects ( $87 \pm 60$  hours vs.  $141 \pm 122$  hours;  $p=0.01$ )
  - no reliable cut-off diameter or length that could be determined for sharp foreign bodies to predict prolonged transit times
  - delayed passage was associated with larger object diameter, presence of constipation, and significant colon loading on x-ray ( $p<0.0001$  for both constipation and loaded colon)
  - no long-term complications were observed in any child during follow-up

- in patient who required intervention (nine patients):
  - 7 patients required endoscopic removal for foreign body lodged in stomach for  $\geq 7$  days
  - 1 child required open enterotomy to remove two magnets in small bowel
  - 1 child with anorectal malformation who ingested a stapler pin required sigmoid colostomy and surgical retrieval

Two retrospective studies analysed SAP objects or water beads ingestion in children consistently reported favourable clinical outcomes, with endoscopic removal being rarely necessary. In a 21-year retrospective cohort from a U.S. poison centre, 217 paediatric cases of SAP object ingestion were analysed. None resulted in bowel obstruction, endoscopic procedures, or hospital admissions. The majority (84%) involved children under 6 years, and most (83%) were managed at home without incident. Although ingestion quantities varied, including some with reportedly up to 70 beads, less than 1% developed moderate symptoms (mostly vomiting), and no major effects or deaths were recorded.<sup>28, level II-2</sup>

Similarly, a 10-year Turkish study on 21 paediatric patients also found that all were asymptomatic and had uneventful recoveries. Water beads were described as round, slippery, and soft, which facilitated easy swallowing and allowed them to transit through the GI without complications. Radiological and laboratory evaluations were uniformly normal, and no surgical or endoscopic interventions were required. Notably, none of the patients showed signs of obstruction even when multiple beads were ingested.<sup>28, level II-2</sup>

Both studies suggest that due to their texture and the likelihood of passing the pylorus before maximal expansion, SAP objects generally do not require endoscopic removal in asymptomatic or mildly symptomatic children. However, the authors emphasized that clinical judgment remains paramount, especially in younger children or those presenting with persistent vomiting, where rare but serious complications have been documented in the broader literature.

### 5.3 Endoscopy

In a meta-analysis of paediatric oesophageal foreign bodies retrieval, foreign bodies were mainly localised at the upper oesophagus (69.6%). Although flexible oesophagoscopy was slightly more effective and safer than rigid oesophagoscopy, there were no significant differences between the two on the following outcomes:<sup>30, level II-2</sup>

- success rate (OR=1.89, 95% CI 0.94 to 3.81)
- complication rate (OR=0.88, 95% CI 0.34 to 2.29)

There was no report on the quality of the primary evidence.

In a cross-sectional study on patients under 15 years old with foreign body ingestion, all foreign bodies in the oesophagus required endoscopic removal. Despite 60.31% of the foreign bodies (which included food bolus) beyond oesophagus passed spontaneously, endoscopic removal was required for blunt objects causing symptoms, button batteries, multiple magnet and sharp objects in the stomach and duodenum. Only 1.03% of foreign bodies were removed surgically and located beyond the duodenum.<sup>31, level III</sup>

In a single-centre cross-sectional study of children who presented to the emergency department with foreign body ingestion and underwent upper endoscopy, a foreign body was identified and successfully removed without complication in 91% of cases. Most patients were symptomatic at presentation (84%), regardless of the anatomical location of the foreign body.<sup>32, level III</sup>

Similarly, in another cross-sectional study on foreign body ingestion in children, the authors reported a 97% success rate in endoscopic retrieval and did not observe any procedure-related complications.<sup>33 (level III)</sup>

In a single-centre cross-sectional study looking into the timing of button battery removal from the upper GI system in children, found that:<sup>34, level III</sup>

- emergent removal if the button battery is lodged in the oesophagus regardless of any presenting symptoms
- early removal within 24 hours should be considered if the button battery is located in the stomach, especially in children <5 years old or button battery size  $\geq 20$  mm, despite the absence of symptoms

A cross-sectional study identifying factors associated with complications of button battery ingestion in children reported the following endoscopic findings:<sup>3, level III</sup>

- button battery located in the oesophagus resulted in major complications such as mucosal injury, perforation, and potential for fistula formation even when removed promptly
- button battery in the stomach lead to moderate to major complications, especially when >15 mm in diameter, with gastric ulcers and necrosis observed in some cases despite removal within 5 - 8 hours
- all lithium button batteries ingested had complications regardless of anatomical location above the duodenum

A large multicentre cross-sectional study identified the most important predictor of severe clinical outcomes and trends of button battery ingestion in children, findings showed:<sup>35, level III</sup>

- button battery diameter of 20 to 25 mm was the strongest predictor of severe outcomes, including fatality or life-threatening/ disabling complications (OR=24.6;  $p<0.001$ ), followed by age <4 years (OR=3.2;  $p<0.0001$ ) and ingestion of >1 battery (OR=2.1;  $p<0.02$ )
- lithium button batteries were significantly more likely to cause serious complications compared to other chemistries ( $p<0.01$ )

Another cross-sectional study on the endoscopic findings of button battery ingestion in children (median age 1 year and 10 months) described that all button battery ingestions located at the oesophagus had mucosal injury. Among those located in the stomach, 50% showed mucosal damage, with a trend toward younger age in patients. However, no significant difference was observed between the time from ingestion to endoscopy and the presence of mucosal injury.<sup>36, level III</sup>

In a multicentre cross-sectional study looking into the gastric injury secondary to button battery ingestion in children, endoscopic findings of retained button battery within the stomach showed that:<sup>37, level III</sup>

- time to removal <12 hours significantly reduced risk of injury. Children with button battery removal after 12 hours were 4.44 times more likely to have gastric mucosal damage than those removed earlier (OR=4.44, 95% CI 1.38 to 14.34)
- children aged  $\geq 5$  years old were less likely to develop gastric mucosal injury (OR=0.28, 95% CI 0.08 to 0.93)
- mucosal injury was found in 76% of symptomatic patients and 55% of asymptomatic patients, indicating that symptoms are a poor predictor of injury
- one severe case involved gastric perforation and pneumoperitoneum due to battery impaction for 117 hours

Therefore, endoscopic removal of gastric button battery ingestion within 12 hours can be considered regardless of symptoms or age group, given the risk of gastric mucosal damage.

A single centre cross sectional study aimed to evaluate features, clinical presentation and clinical outcome of children who have ingested cylindrical batteries, findings showed cylindrical batteries were retained in the oesophagus in two of 45 children (4.4%), in the stomach in 19 of 45 children (42.2%), and in the duodenum or beyond in the remaining 24 of 45 children (53.3%). None of the patients who underwent endoscopic removal (12/45) had any oesophageal or gastric mucosal lesions. No cases of intestinal perforation or surgical complications were reported.<sup>38, level III</sup>

According to the NASPGHAN consensus guidelines, emergent endoscopic removal is recommended in cases of SAP object ingestion. In situations where ingestion is suspected but not witnessed, endoscopy may be warranted even in the absence of clinical symptoms, based on the level of suspicion. If upper endoscopy fails to locate the object, clinicians should maintain a high index of suspicion for distal bowel obstruction.<sup>7, level III</sup>

#### 5.4 Surgery

In a cross-sectional study on the surgical management of foreign body ingestion in 108 children, prompt surgery was indicated in cases with foreign body-related complications. (e.g. haemorrhage, gastrointestinal perforation and intestinal obstruction). Surgical intervention was warranted after failure of conservative management or endoscopic removal. Post-operative complications occurred in 8.3% of cases including anastomotic leakage (0.9%), wound infection (3.7%) and adhesive ileus (3.7%).<sup>39, level III</sup>

In another cross-sectional study on multiple magnet ingestion in children, laparotomy or laparoscopy were the treatment options among those who required surgical intervention and showed minimal complications (i.e. ileus).<sup>40, level III</sup>

In a retrospective review of case reports and case series on 43 cases of bowel obstruction following ingestion of SAP beads, surgical intervention was required in nearly all cases (95.3%), primarily through enterotomy or, in some instances, bowel resection.<sup>41, level III</sup>

Based on various clinical guidelines for foreign body ingestion in children, the management options are outlined according to the anatomical location and type of foreign body, as detailed in **Appendix 4**:<sup>7, level III; 21; 31, level III; 42, level III; 43, level III; 44, level III</sup>

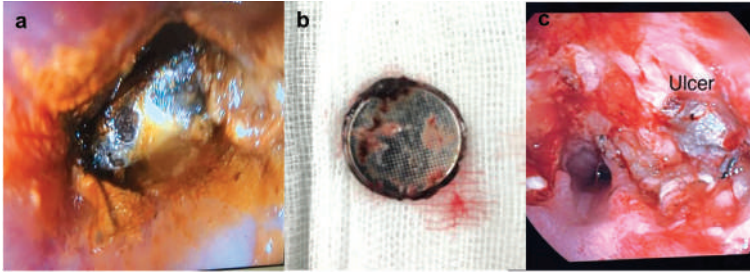
The DG opines that the treatment based on the location and type of foreign bodies are as outlined below:

LOCATION		OESOPHAGUS	STOMACH & DUODENUM	BEYOND DUODENUM	
TYPE OF FOREIGN BODY	SYMPTOMS				
<b>Blunt</b>	Symptomatic	Emergent endoscopic removal	Urgent endoscopic removal	Surgical/ endoscopic removal	
	Asymptomatic	Urgent endoscopic removal	Allow spontaneous passage. Repeat X-ray in 2 - 4 weeks. If does not pass in 2 - 4 weeks for endoscopic removal	Allow spontaneous passage	
<b>Button battery (BB)</b>	Symptomatic	Emergent endoscopic removal	Emergent endoscopic removal	Surgical/ endoscopic removal	
	Asymptomatic		Age <5 years old and/or BB ≥20 mm - urgent endoscopic removal Age ≥5 years old and BB <20 mm - observation Repeat X-ray at 10-14 days, remove if persist	Allow spontaneous passage with advice	
<b>Magnet</b>	<b>Single</b>	Symptomatic	Emergent endoscopic removal	Urgent endoscopic removal	Surgical/ endoscopic removal
		Asymptomatic	Urgent endoscopic removal	Allow spontaneous passage. Repeat X-ray in 2 - 4 weeks. If does not pass in 2 - 4 weeks, for endoscopic removal	Allow spontaneous passage
	<b>Multiple</b>	Symptomatic	Emergent endoscopic removal	Urgent endoscopic removal	Surgical/ endoscopic removal
		Asymptomatic	Urgent endoscopic removal	Urgent endoscopic removal	In patient observation, repeat X-ray every 8-12 hours. If progress, repeat again X-ray every 8 - 12 hourly until spontaneous passage. If not progress, for surgical removal
<b>Sharp</b>	Symptomatic	Emergent endoscopic removal	Urgent endoscopic removal	Surgical / endoscopic removal	
	Asymptomatic		May allow spontaneous passage with repeat X-ray in 3 to 5 days. If no progress, for endoscopic/surgical removal	Allow spontaneous passage, with repeat X-ray in 3 to 5 days. If no progress, for endoscopic/surgical removal	
<b>Superabsorbent polymer</b>	Symptomatic	Endoscopic/Surgical removal			
	Asymptomatic	Observe or Discharge with Advice after Paediatric Surgical Consult			

**Recommendation 3**

- Endoscopic removal should be done for all foreign body ingestion in children lodged in:
  - oesophagus, regardless of symptoms
  - stomach, presenting with symptoms
- Urgent endoscopic removal within 24 hours should be done for all asymptomatic children with button battery in the stomach if:
  - child aged <5 years, OR
  - button battery  $\geq 20$  mm in diameter
- In asymptomatic children aged  $\geq 5$  years with <20mm button battery in the stomach, repeat abdominal X-ray at 10 - 14 days. If the button battery is still in the stomach, endoscopic removal should be done.
- Endoscopic removal should be done for all sharp foreign bodies in the stomach, however those who are asymptomatic, spontaneous passage may be allowed.
- Asymptomatic patients with sharp objects ingestion beyond the duodenum requires repeat abdominal X-ray after 3 - 5 days and removal if there is no progression.
- Surgical intervention should be done in children with foreign body ingestion when there is:
  - foreign body-related complications (absolute indication)
  - failure of conservative management or endoscopic removal
  - symptomatic patients with foreign body lodged beyond the duodenum

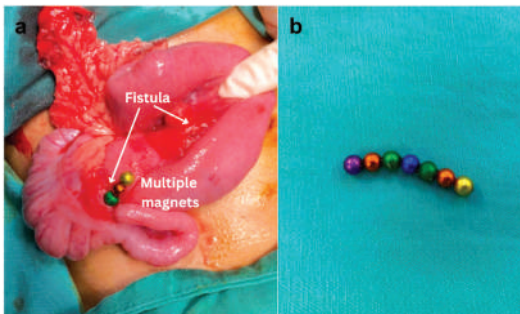
## INTERVENTIONAL FINDINGS OF FOREIGN BODY INGESTION IN CHILDREN



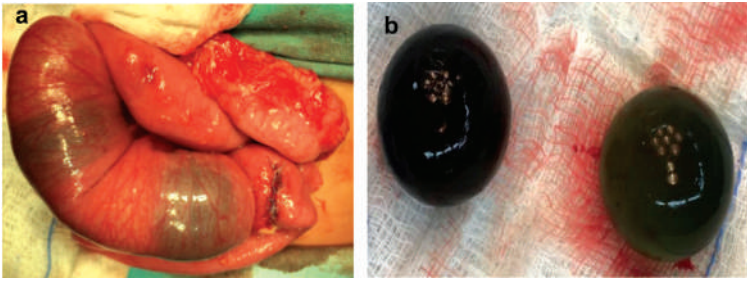
**Figure 7:** a) Endoscopic finding of button battery embedded in the oesophageal mucosa, b) Button battery that was removed, c) Subsequent follow-up endoscopy showing oesophageal mucosal ulceration.



**Figure 8:** Laparoscopic-assisted removal of multiple magnets from the small bowel.



**Figure 9:** a) Intraoperative findings during laparotomy showing multiple magnets within adjacent bowel loops with entero-colic fistula formation, b) Multiple magnet that was removed.



**Figure 10:** a) Intraoperative finding showing dilated small bowel, due to b) Jelly balls (superabsorbent polymer).



**Figure 11:** Intraoperative finding of a different patient with small bowel obstruction following ingestion of superabsorbent polymer object.

## 6. DISCHARGE AND FOLLOW-UP

### 6.1 Discharge

There is limited high-quality evidence establishing safe discharge criteria for patients with foreign body ingestion. Most evidence is derived from consensus statements and expert opinion, rather than high-quality empirical data.

According to the 2024 consensus guideline by The Royal Children's Hospital, Melbourne, a child with foreign body ingestion may be safe for discharge if all the following clinical criteria are met:<sup>13, level III</sup>

- the child is well appearing
- pain-free
- not in respiratory distress
- able to eat and drink
- with a reliable history and the ingested object is considered a low-risk\* foreign body  
(\*a low-risk foreign body means it does not belong to a high-risk foreign body as listed in section 3.1)

ESPGHAN has recommended that once the button battery has passed beyond the oesophagus, and patients are asymptomatic at diagnosis, these patients can be discharged safely with outpatient follow-up.<sup>22, level III</sup>

Similarly, the National Button Battery Task Force (BBTF) under the American Academy of Pediatrics has suggested that outpatient observation may be considered in asymptomatic cases with button batteries in the stomach, provided the following criteria are met:<sup>45, level III</sup>

- No history of prior oesophageal disease
- No co-ingestion with magnet
- Reliable follow-up is ensured

Another consensus report by The Royal College of Emergency Medicine on the ingestion of magnets in children recommends that the following patients should be considered suitable for discharge after magnet ingestion:<sup>18, level III</sup>

- single magnet ingestion
- accidental ingestion
- no co-morbidities
- tolerating oral intake
- presents within 24 hours of ingestion
- caregiver able to provide close observation

Consensus guidelines by the Italian Society of Paediatric Gastroenterology, Hepatology and Nutrition (SIGENP) and The Italian Association of Hospital Gastroenterologists and Endoscopists (AIGO) recommend that selected children with foreign body ingestion may be safely discharged and managed as outpatients under the following conditions:<sup>43, level III</sup>

- asymptomatic stomach retention of blunt or non-button battery foreign bodies, provided the foreign body is  $\leq 25$  mm in diameter or 60 mm in length. These patients should be followed up with serial X-rays (for removal if failing to pass spontaneously after 4 weeks)
- for button battery ingestion: discharge if button battery has passed into the intestine and patient is asymptomatic, X-ray every four days for button battery  $>15$  mm or every 10 days if  $<15$  mm

Asymptomatic children with sharp object ingestion beyond the duodenum may be considered for discharge with follow up if there is easy access to the appropriate level of care.

The summary table for **safe discharge recommendations** by international organisations and institutions is shown in **Appendix 5**.

#### Recommendation 4

- A child with foreign body ingestion may be safe for discharge if all the following clinical criteria are met:
  - the child is well appearing
  - pain-free
  - not in respiratory distress
  - able to eat and drink
  - with a reliable history and the ingested object is considered a low-risk\* foreign body  
(\*a low-risk foreign body means it does not belong to a high-risk foreign body as listed in section 3.1)
- Asymptomatic children with the following foreign body ingestion may be considered for discharge and follow-up;
  - children  $\geq 5$  years of age with  $<20$  mm button battery ingestion beyond the oesophagus
  - single magnet ingestion beyond the oesophagus
  - blunt object ingestion beyond the oesophagus

#### 6.1.1 Discharge Advice

Discharge advice to caregivers is an essential component of comprehensive management of paediatric foreign body ingestion. Evidence supports that a well-informed caregiver can facilitate early identification of complications, reduce unnecessary return visits, and prevent future incidents. The following evidence-based highlights key elements for caregiver guidance upon discharge.

In the event of clinical deterioration in children with foreign body ingestion, caregivers should be advised to return promptly to the ED for re-evaluation.<sup>46, level III</sup>

Discharge education must emphasise being vigilant for symptoms suggestive of complications of foreign body ingestion in children, where caregivers should seek urgent medical attention. Caregivers should be alert to the following symptoms:<sup>13, level III; 14, level III</sup>

- respiratory distress
- abdominal pain or distension
- persistent vomiting
- fever
- inability to tolerate oral intake
- GI bleeding (e.g. haematemesis/melaena)

In the consensus report on the management of ingested foreign bodies in children by the NASPGHAN Endoscopy Committee, specific parental education and discharge advice following magnet ingestion include:<sup>7, level III</sup>

- removal of all magnetic objects from the child's surroundings
- avoidance of clothing with metallic buttons or belts with metal buckles
- ensuring that no metal objects or magnetic objects are accessible to the child to prevent accidental re-ingestion

Caregivers should receive counselling on strategies to prevent the recurrence of foreign body ingestion in children. (Refer to the **Chapter 7 on Prevention**).<sup>14, level III</sup>

Follow-up instructions should be documented and explained, with emphasis on when and how to seek re-evaluation. Discharge planning should account for patient-specific risk factors and the nature of the ingested foreign body.<sup>14, level III</sup>

**Recommendation 5**

- Caregivers of children with foreign body ingestion should be advised to seek urgent medical attention if any of the following symptoms are present:
  - respiratory distress
  - abdominal pain or distension
  - persistent vomiting
  - fever
  - inability to tolerate oral intake
  - gastrointestinal bleeding (e.g., haematemesis or melaena)
- Caregivers of children with magnet ingestion should be advised to:
  - remove all magnetic objects from the child's surroundings
  - avoid clothing with metallic buttons or belts with metal buckles
  - ensure no metal objects or magnetic objects are accessible to the child to prevent accidental re-ingestion

**6.2 Follow-up**

Foreign body ingestion in children requires vigilant outpatient follow-up to ensure complete passage and to detect any possible complications. Follow-up should include clinical assessment, serial imaging, and thorough caregiver education.

**6.2.1 Following conservative management**

In general, approximately 80% of foreign bodies were expelled by day 14 of ingestion and thus, outpatient follow-up is recommended within 1 - 3 weeks from the day of ingestion to confirm passage.<sup>47, level III</sup> However, the transit time is expected to be longer in regularly shaped objects >19.5 mm and irregularly shaped objects >22.5 mm.<sup>48, level III</sup>

The NASPGHAN guidelines advocate follow-up for asymptomatic foreign body ingestion in children as below:<sup>7, level III</sup>

- Coin ingestion at stomach through serial radiographs every 1 - 2 weeks until clearance is confirmed. If retention persists beyond 2 - 4 weeks, elective endoscopic removal may be considered.
- Button battery ingestion in stomach and beyond in children aged ≥5 years and battery size <20 mm
  - if asymptomatic and failure to pass in stool, repeat radiographs at day 10 - 14
  - if symptomatic or retained in the stomach, it requires endoscopic removal
- single magnet beyond the oesophagus, if asymptomatic, observation with serial X-rays may be appropriate.

A suggested radiographic protocol for monitoring progress of foreign body passage through the gastrointestinal tract in children is based on the type of foreign body:<sup>49, level III</sup>

- for blunt objects:
  - weekly radiographs to monitor progression in asymptomatic cases
  - surgical removal should be considered if objects remain in the same location distal to the duodenum for >1 week
- for coins:
  - weekly radiographs to monitor progression in asymptomatic cases
  - endoscopic removal should be considered if objects remain in the stomach 3 - 4 weeks
- for batteries:
  - button battery in stomach and beyond -
    - a radiograph every 3 - 4 days to monitor progression
    - batteries remaining within the stomach >48 hours should be retrieved endoscopically
  - cylindrical battery beyond the stomach -
    - can be managed by checking the stool for passage of the battery with a follow-up radiograph in 10 - 14 days

ESPGHAN has recommended that once the button battery has passed the oesophagus, and patients are asymptomatic at diagnosis,<sup>22, level III</sup>

- follow-up AXR should be performed after 7 - 14 days to confirm passage unless parents have observed its passage in the stools
- if it is not passed the stomach by 7 - 14 days, endoscopic removal is necessary as the chance of spontaneous passage is minimal

In a cross-sectional study on GIT transit times for commonly ingested radio-opaque foreign bodies in children, 80% of foreign bodies were expelled by day 14 of ingestion, foreign body retained beyond the common transit times (by day 37, 7 and 23 for coins, batteries and other radiopaque foreign bodies respectively) may warrant further investigations or intervention.<sup>47, level III</sup>

In a single-centre cross-sectional study on sharp object ingestion in the paediatrics age group, once the foreign body passed beyond the oesophagus, the average time taken for expulsion was 2.5 days and the longest time taken was 5 days.<sup>50, level III</sup>

The DG opines that asymptomatic child with retained foreign body ingestion should be followed up with serial imaging based on the type and risk profile of the ingested object:

- for blunt objects and coins, serial X-rays at least every 2 weeks and a retained foreign body beyond 4 weeks warrant intervention.
- for sharp objects, to repeat X-ray in 3 to 5 days and for removal if no progress
- Stool monitoring is not required to confirm passage

### Recommendation 6

- Children  $\geq 5$  years old with button battery  $< 20$  mm in size in stomach should be followed up with:
  - repeated X-rays at 10 to 14 days
  - endoscopic removal if retained in the stomach

### 6.2.2 Following the removal of the foreign body

In general, no follow-up is required after foreign body removal, as complications are uncommon and minimal, except in cases involving the removal of an oesophageal button battery.

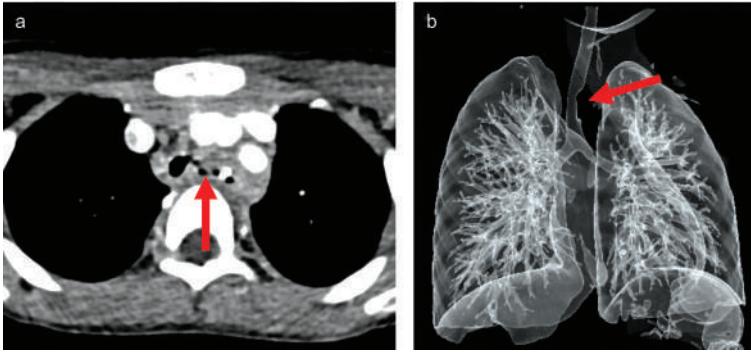
Oesophageal stenosis is the most common delayed complication following oesophageal foreign body impaction, with an incidence reported between 31% to 35% and re-evaluation is recommended, especially in those with a longer duration of impaction, foreign body diameter of  $\geq 20$  mm, and unwitnessed ingestion. Contrast study or endoscopy within the first 4 weeks is advised to look for stenosis.<sup>51-52, level III</sup>

A multicentre cross-sectional study reported beyond oesophageal stenosis the following major complications of button battery ingestion within the oesophagus included tracheoesophageal fistulas (**Figure 12**), oesophageal perforations, vocal cord paralysis from recurrent laryngeal nerve damage, mediastinitis, cardiac or respiratory arrests, pneumothorax, pneumoperitoneum, tracheal stenosis or tracheomalacia, aspiration pneumonia, empyema, lung abscess, and spondylodiscitis. These complications may develop days to weeks post-removal, highlighting the need for:<sup>35, level III</sup>

- close clinical follow-up
- parental education on warning signs
- timely referral to specialist care if symptoms suggestive of complications arise

**Recommendation 7**

- Follow-up endoscopic assessment [with or without gastrointestinal (GI) contrast study] should be done in symptomatic children with button battery ingestion following removal of foreign body.
- GI contrast study evaluation 4 weeks after button battery removal (to look for evidence of oesophageal stenosis) may be considered in mild or asymptomatic children with foreign body ingestion.



**Figure 12:** a) A cross-sectional CT scan showing an abnormal air-filled tract seen communicating the trachea and the oesophagus at T2/T3 measures approximately 1 cm in length and about 1.4 cm from carina. It is at aortic arch level. b) A 3D-reconstruction image showing irregular outline of the left lateral wall of trachea from the level of T2 to T4 suggestive of trachea cartilage rings disruption.

## 7. PREVENTION

Prevention strategies are essential to minimise the incidence of foreign body ingestion in children, thus reducing its morbidity and mortality.

### 7.1 General Prevention of Foreign Body Ingestion

The role of healthcare providers in primary prevention of foreign body ingestion in children is educating parents, teachers and children. These prevention strategies are also reflected in the '*Buku Rekod Kesihatan Bayi dan Kanak-Kanak (0-6 tahun)*' (Refer **Appendix 6**)

The following advice can be provided in preventing foreign body ingestion in children:<sup>46, level III</sup>

- toys to be age-appropriate
- small objects to be kept out of reach of young children
- tape shut battery compartments on toys
- store batteries and magnets in locked safety boxes out of reach of children

### 7.2 Prevention of Magnet Ingestion

Multiple magnets set recall has reduced the incidence and morbidity of magnet ingestion in children. Hence, preventive rules and recalls are important for eliminating the availability of these hazardous magnets.<sup>53-54, level III</sup> The presence of warning labels alone did not prevent high-powered magnet ingestion in children.<sup>55, level III</sup>

### 7.3 Prevention of Button Battery Ingestion

The following has been recommended in the prevention of button battery ingestions in children.<sup>22; 25, level III; 35, level III; 56-57, level III</sup>

- **Purchasing Practices and, Safe Handling and Storage:**
  - Purchase products with secured battery compartments
  - Check and secure (tape if necessary) battery compartments of all household product
  - Do not allow children to play with batteries or battery-powered products with easily accessible batteries
  - Ensure battery compartments require a tool or child-resistant mechanism to open
  - Do not insert or change batteries in front of children
  - Store batteries out of children's reach and sight
  - Wrap used batteries in strong tape and dispose of them safely (recycle or secure waste bin)
- **Education and Legislation:**
  - Create public awareness e.g. placing educational posters on button battery injury prevention in clinics
  - Educate medical professionals through meetings and conferences.

- Report button battery injuries e.g. Global Injury Research Collaborative (GIRC, [www.globalirc.org](http://www.globalirc.org))
- Re-evaluate current legislation to improve safety
- **Industry and Manufacturing Responsibilities:**
  - Develop safer battery designs (e.g. quantum tunnelling composite-coated batteries, non-toxic bitter coatings)
  - Develop secured battery compartments regardless of the product's intended user
  - Mandate warnings on packaging regarding ingestion risks and the need for urgent medical attention upon ingestion
  - Ensure child-resistant packaging -
    - Sell button batteries in individual blisters and double packaging
    - Use child-resistant compartments for hearing aid batteries

### **Recommendation 8**

- To prevent foreign body ingestion in children, caregivers should be advised to:
  - purchase age-appropriate toys
  - keep small objects out of reach of young children
  - tape shut battery compartments on toys and all household products
  - store batteries and magnets in locked safety boxes out of reach of children
  - avoid purchasing rare earth magnets in households with young children

## 8. IMPLEMENTING THE GUIDELINES

The management of foreign body ingestion in children should follow an evidence-based approach to deliver safe, timely and resource-appropriate care. Several factors may influence the uptake of this CPG.

### 8.1 Facilitating and Limiting Factors

Existing facilitators for implementation include:

1. Active dissemination of the CPG (print, Portable Document Format (PDF) and mobile-optimised formats) to all levels of healthcare facilities.
2. Regular updates on the management of paediatric foreign body ingestion at all relevant national specialities' meetings.
3. Growing public and professional awareness of foreign-body ingestion hazards, for example social-media campaigns warning parents about button batteries, regulatory recalls of high-power magnet toys reported in mainstream media, and continuous medical education webinars that emphasise the two-hour window for oesophageal battery removal.

Existing barriers to implementation are:

1. Limited access to round-the-clock paediatric endoscopy and surgical services, especially in district hospitals.
2. Variation in referral pathways and transport logistics between facilities.
3. Limited data capture on foreign body ingestion presentations and outcomes; no national registry.
4. Caregiver delays in seeking care owing to symptom under-recognition or travel constraints.
5. Limited availability of paediatric-specific equipment and resources.

### 8.2 Potential Resource Implications

To implement the CPG, there must be strong commitment to:

1. ensure widespread distribution of the CPG to healthcare providers via printed and electronic copies
2. reinforce regular training of healthcare providers
3. where possible, ensure trained multidisciplinary team is available at different levels of healthcare
4. ensure widespread distribution of updated patient education materials

### 8.3 Clinical Audit Indicator

In line with the key recommendations in this CPG, the following are proposed as clinical audit indicators.

Percentage of button battery removal from the oesophagus within 2 hours of arrival to referral centre	$\frac{\text{Number of children with button battery ingestion within the oesophagus removed within 2 hours of arrival to referral centre within one year period}}{\text{Total number of children with button battery ingestion within the oesophagus in the same period}} \times 100\%$
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Target of 60%

Implementation strategies will be developed following the approval of the CPG by MoH which include Quick Reference and Training Module and they are made available in the MoH and Academy of Medicine of Malaysia (AMM) websites after development.

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## **CLINICAL QUESTIONS**

### **DIAGNOSIS AND ASSESSMENT**

- 1.1. What are the effective and safe triage criteria for a patient with FBI?
  - Clinical presentations (specific vs non-specific)
  - Standard assessment criteria
    - \*Differential diagnosis
    - \*Risk stratification \*check-list
  
- 1.2. What are the effective and safe clinical assessments in patients suspected with FBI?  
(\*High risk/\*Unsure/\*Low-risk \*High-risk special population)  
\*check-list
  
- 1.3. What are the accurate imaging modalities in diagnosing FB and its complications?  
(\*indication)
  - plain X-ray
  - computed tomography scan (CT-Scan)
  - ultrasonography
  - fluoroscopy\*Type and location of FB
  
- 1.4. What are the referral criteria in FBI? [\*location and \*type of FB (high-risk/low-risk)]

### **TREATMENT**

- 1.5. What is the effectiveness and safety of the following intervention in FBI?  
(\*type and location of FB)
  - endoscopy
  - surgery
  - conservative (\*complementary modalities)

### **DISCHARGE AND FOLLOW-UP**

- 1.6. What are the safe discharge criteria in patients with FBI?
  - location
  - type of FB
  
- 1.7. What are the discharge advices to caregivers?

- 1.8 What are the follow-up criteria and management in patients with FBI?
- location
  - type of FB
- \*e.g. timely, serial radiography on the passage of foreign body in gastrointestinal tract

**PREVENTION**

- 1.9 What are effective and safe prevention strategies for FBI in children?

## EXAMPLE OF SEARCH STRATEGY

**Clinical Question:** What are the effective and safe triage criteria for a patient with Foreign Body Ingestion?

- 1 FOREIGN BODIES/
- 2 (foreign adj1 (bod\* or object\*)).tw.
- 3 Ingest\*.tw.
- 4 coin\*.tw.
- 5 (button adj1 batter\*).tw.
- 6 (Sharp adj1 object\*).tw.
- 7 MAGNETS/
- 8 magnet\*.tw.
- 9 (superabsorbent adj1 polymer\*).tw.
- 10 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9)
- 11 (special adj1 population\*).tw.
- 12 (syndrom\* adj1 child\*).tw.
- 13 (disable\* adj1 child\*).tw.
- 14 CHRONIC DISEASE/
- 15 (chronic adj1 condition\*).tw.
- 16 (chronic adj1 disease\*).tw.
- 17 (chronic\* adj1 ill\*).tw.
- 18 11 or 12 or 13 or 14 or 15 or 16 or 17
- 19 10 or 18
- 20 TRIAGE/
- 21 triage\*.tw.
- 22 (triage adj1 criteria\*).tw.
- 23 (triage adj1 checklist\*).tw.
- 24 (triage adj1 assess\*).tw.
- 25 (primary adj1 triage).tw.
- 26 (secondary adj1 triage).tw.
- 27 (focus adj1 histor\*).tw.
- 28 (focus adj1 assessment\*).tw.
- 29 (rapid adj1 assessment\*).tw.
- 30 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29
- 31 DIAGNOSIS, DIFFERENTIAL/
- 32 (differential adj1 diagnos\*).tw.
- 33 31 or 32
- 34 RISK ASSESSMENT/

- 35 (risk adj1 analys\*).tw.
- 36 (assessment\* adj1 (benefit-risk or risk-benefit)).tw.
- 37 (health risk adj2 assessment\*).tw.
- 38 (risk adj1 assessment\*).tw.
- 39 (benefit risk adj2 assessment\*).tw.
- 40 (benefit\* adj1 risk\*).tw.
- 41 34 or 35 or 36 or 37 or 38 or 39 or 40
- 42 (clinical adj1 presentation\*).tw.
- 43 (red adj1 flag\*).tw.
- 44 (sign\* adj1 symptom\*).tw.
- 45 (specific adj1 presentation\*).tw.
- 46 (presentation\* adj1 (non-specific or nonspecific)).tw.
- 47 (clinical adj1 assessment\*).tw.
- 48 (high adj1 risk\*).tw.
- 49 (low adj1 risk\*).tw.
- 50 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49
- 51 30 or 33 or 41 or 50
- 52 19 and 51
- 53 limit 52 to (english language and humans and yr="2009 -Current"  
and "all child (0 to 18 years)")

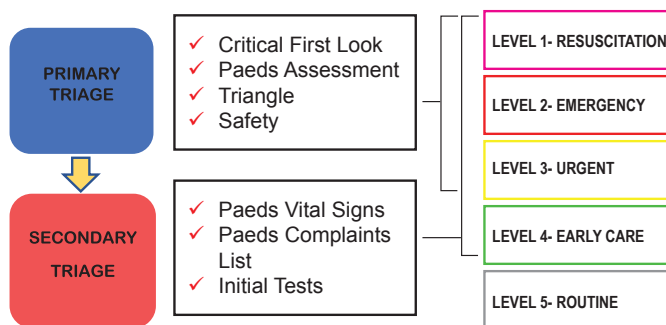
## MALAYSIAN TRIAGE SCALE FOR EMERGENCY AND TRAUMA DEPARTMENTS

### PAEDIATRIC TRIAGE

Paediatric Triage is performed similarly to adults but with different parameters relevant to paediatric patients. Generally, paediatric patients are triaged higher to reduce potential wait times and to facilitate their care processes.

Specific Paediatric Treatment areas or zones are recommended, with medical devices and materials specific for paediatric patients made readily available.

### OVERALL TRIAGE PROCESS IN PAEDIATRICS



Adopted from: Ministry of Health. Malaysian Triage Scale. Putrajaya: MoH;2022

Rapid Assessment of Paediatric patients is performed using Critical First Look and the Paediatric Assessment triangle in younger children. Children identified with danger signs must be moved to Resuscitation, immediate Emergency Care, or Urgent Attention.

Triage	Level 1 Resuscitation	Level 2 Emergency	Level 3 Urgent
APPEARANCE			
Tone	<ul style="list-style-type: none"> <li>• Limp or Flaccid</li> </ul>	<ul style="list-style-type: none"> <li>• Weak/Limited Movement</li> </ul>	<ul style="list-style-type: none"> <li>• Movement or vigorously resisting examination</li> <li>• Good Muscle Tone</li> </ul>
Interactiveness	<ul style="list-style-type: none"> <li>• Unresponsive</li> <li>• Lethargic</li> </ul>	<ul style="list-style-type: none"> <li>• Uninterested in surroundings or play</li> </ul>	<ul style="list-style-type: none"> <li>• Alert</li> <li>• Attentiveness to the surroundings</li> <li>• Interest to play or reaching for item</li> </ul>

Triage	Level 1 Resuscitation	Level 2 Emergency	Level 3 Urgent
Consolability	<ul style="list-style-type: none"> <li>No cry</li> <li>Very weak cry</li> </ul>	<ul style="list-style-type: none"> <li>Crying or agitated, that is unrelieved by reassurance</li> </ul>	<ul style="list-style-type: none"> <li>Ability to be consoled or comforted by parent or caregiver</li> </ul>
Look/Gaze	<ul style="list-style-type: none"> <li>Blank stare</li> </ul>	<ul style="list-style-type: none"> <li>Gaze fixed to a face</li> </ul>	<ul style="list-style-type: none"> <li>Looking around</li> </ul>
Speech/Cry	<ul style="list-style-type: none"> <li>No speech</li> <li>No cry</li> </ul>	<ul style="list-style-type: none"> <li>Weakly crying</li> <li>High-pitched</li> </ul>	
<b>WORK OF BREATHING</b>			
Abnormal Airway Sounds	<ul style="list-style-type: none"> <li>Snoring, Muffled or hoarseness in speech</li> <li>Stridor, grunting or wheezing</li> </ul>	<ul style="list-style-type: none"> <li>Difficulty in swallowing</li> <li>Wheezing</li> <li>Drizzling</li> </ul>	
Abnormal Positioning	<ul style="list-style-type: none"> <li>Sniffing position, tripod position</li> </ul>	<ul style="list-style-type: none"> <li>Unable to walk</li> <li>Refusal to lie down</li> </ul>	
Retractions	<ul style="list-style-type: none"> <li>Head bobbing for infants</li> </ul>	<ul style="list-style-type: none"> <li>Supraclavicular, intercostal or substernal retractions</li> <li>Increased work of breathing</li> </ul>	<ul style="list-style-type: none"> <li>Tachypnoea</li> </ul>
Flaring		<ul style="list-style-type: none"> <li>Nasal flaring on inspiration</li> <li>Accessory muscles</li> </ul>	
<b>CIRCULATION</b>			
Pallor		<ul style="list-style-type: none"> <li>Pale mucous membranes/sole/palm</li> </ul>	
Mottling, Cyanosis	<ul style="list-style-type: none"> <li>Patchy or bluish skin discolouration</li> </ul>		
Capillary Refil Time	<ul style="list-style-type: none"> <li>Cold Peripheries</li> <li>CRT &gt;5 secs</li> </ul>	<ul style="list-style-type: none"> <li>CRT &gt;2 secs</li> </ul>	

Children without danger signs identified by the Paediatric Assessment Triangle at Primary Triage should proceed to Registration and Secondary Triage. Children should not be routinely triaged-away.

At Secondary Triage, children may be given priority to early assessment. They may be triaged to Levels 1 - 4 as needed. Generally, children, especially those below 8 years old should not be triaged at Level 5 - Routine. Infants, below 1 year old should be at Level 4 or higher.

At Secondary Triage, assessment of children is performed by measurement of vital signs, some initial fasts and biometric measurements, and considerations for their presenting symptoms (as listed in Complaints List (Paediatrics)).

## Appendix 4

**MANAGEMENT OPTIONS BASED ON ANATOMICAL LOCATION AND TYPE OF FOREIGN BODY FROM  
VARIOUS GUIDELINES**

LOCATION		OESOPHAGUS					
		NASPGHAN	ESPGHAN	ASGE	COLORADO	CMU	SIGENP/AIGO
BLUNT FOREIGN BODY	Symptomatic	Emergent endoscopic removal (if unable to manage secretions); otherwise, urgent	Emergent endoscopic removal	Emergent endoscopic removal	All in oesophagus should be removed (endoscopic Foley's catheter) Or push in stomach (bougienage) within 24 hours	Emergent endoscopic removal	Emergent endoscopic removal
	Asymptomatic	Within 24 hours, endoscopic removal	Urgent endoscopic removal	Urgent endoscopic removal or push in stomach	All in oesophagus should be removed (endoscopic Foley's catheter) Or push in stomach (bougienage) within 24 hours	Urgent endoscopic removal	Urgent endoscopic removal

OESOPHAGUS								
LOCATION		NASPGHAN	ESPGHAN	ASGE	COLORADO	CMU	SIGENP/AIGO	
<b>BUTTON BATTERY</b>	Irrespective of symptoms	Emergent endoscopic removal					Emergent endoscopic removal	
	Single	If single, allow for spontaneous passage Remove if at risk for further ingestion	Emergent endoscopic removal if symptomatic, urgent removal if asymptomatic	Urgent removal		All in the oesophagus should be removed (endoscopic Foley's catheter) Or push in the stomach (bougienage) within 24 hours	Emergent endoscopic removal if symptomatic Urgent endoscopic removal if asymptomatic	-
<b>MAGNET</b>	Multiple	Endoscopic removal	Urgent removal					

OESOPHAGUS							
LOCATION		NASPGHAN	ESPGHAN	ASGE	COLORADO	CMU	SIGENP/AIGO
<b>SHARP FOREIGN BODY</b>		Emergent endoscopic removal (if unable to manage secretions); otherwise urgent		Emergent endoscopic removal	All in the oesophagus should be removed (endoscopic Foley's catheter) Or push in the stomach (bougienage) within 24 hours		Emergent endoscopic removal
	Irrespective of symptoms						

LOCATION		STOMACH & DUODENUM					
		NASPGHAN	ESPGHAN	ASGE	COLORADO	CMU	SIGENP/AIGO
BLUNT FOREIGN BODY	Symptomatic	Urgent endoscopic removal	Endoscopic removal	Endoscopic removal	Endoscopic removal	Urgent endoscopic removal	Urgent endoscopic removal
	Asymptomatic	Allow spontaneous passage If does not pass in 2 - 4 weeks for endoscopic removal  Urgent endoscopic removal if - diameter >25 mm, length >60 mm	Allow spontaneous passage  Endoscopic removal if diameter >25 mm, length > 60 mm, or if does not pass in 4 weeks	Endoscopic removal if - diameter >25 mm, length >60 mm, or, does not pass in 3 - 4 weeks	Endoscopic removal in large object: - age <1 year: 20 - 30 mm or - age ≥ 1 year: 30 - 50 mm	Allow spontaneous passage Endoscopic removal if not passed in 3 - 4 weeks  Urgent endoscopic removal if - diameter ≥25 mm, length > 50 mm	Elective removal if: - diameter >25 mm, or, - length >60 mm, or, - fails to pass spontaneously after 4 weeks

LOCATION		STOMACH & DUODENUM					
		NASPGHAN	ESPGHAN	ASGE	COLORADO	CMU	SIGENP/AIGO
Symptomatic		Emergent endoscopic removal	Emergent endoscopic removal	Endoscopic removal	Endoscopic removal		Emergent endoscopic removal
		Age <5 years old and BB $\geq$ 20 mm – urgent endoscopic removal					
Asymptomatic		Age $\geq$ 5 years old and BB $\geq$ 20 mm Repeat film at 48 hours, remove if persist or patient develops symptoms.	For presentation <12 hours, for repeat X-ray in 7 - 14 days.  For presentation >12 hours, consider endoscopy and/or CT scan to assess vascular injury	Allow observation, repeat film at 48 hours  If it persists, for endoscopic removal	Allow observation, but if no progression in 3 - 4 days, for endoscopic removal	Urgent endoscopic removal	Emergent endoscopic removal if <5 years  Urgent endoscopic removal if >5 years
	<b>BUTTON BATTERY</b>						

STOMACH & DUODENUM						
LOCATION	NASPGHAN	ESPGHAN	ASGE	COLORADO	CMU	SIGENP/AIGO
MAGNET	Allow spontaneous passage or removal if at risk for further ingestion	Allow spontaneous passage	Urgent endoscopic removal	-	Urgent endoscopic removal if symptomatic  If asymptomatic, allow spontaneous passage  Endoscopic removal if - diameter >25 mm, length > 50 mm, or, not pass in 3 - 4 weeks	Emergent endoscopic removal
	Multiple	Endoscopic removal				Urgent endoscopic removal

LOCATION		STOMACH & DUODENUM					
		NASPGHAN	ESPGHAN	ASGE	COLORADO	CMU	SIGENP/AIGO
SHARP FOREIGN BODY	Symptomatic	Emergent endoscopic removal (Surgery if signs of perforation)	Emergent endoscopic removal	Urgent endoscopic removal	Endoscopic removal	Urgent endoscopic removal	Emergent endoscopic removal
	Asymptomatic	Urgent removal					

LOCATION		BEYOND DUODENUM					
		NASPGHAN	ESPGHAN	ASGE	COLORADO	CMU	SIGENP/AIGO
BLUNT FOREIGN BODY	Symptomatic	Surgical removal (or enteroscopy)	-	Surgical removal if located in the same location longer than 1 week	Surgical removal if large object with weekly repeat film and no progression more than 1 week	Surgical removal	-
	Asymptomatic	Allow spontaneous passage				Spontaneous passage / surgical removal if no progression in 1 week	

LOCATION		BEYOND DUODENUM					
		NASPGHAN	ESPGHAN	ASGE	COLORADO	CMU	SIGENP/AIGO
Symptomatic		Removal			Removal	Surgical removal	
Asymptomatic		Observe for 48 hours, if it persists on X-ray, consider removal			Observe for 3 - 4 days, if it persists on X-ray, for removal	Allow for spontaneous passage (inpatient). Surgical removal if no progression in X-ray in 3 days	
<b>BUTTON BATTERY</b>							

LOCATION		BEYOND DUODENUM					
		NASFGHAN	ESFGHAN	ASGE	COLORADO	CMU	SIGENP/AIGO
MAGNET	Single	Allow spontaneous passage	Allow for spontaneous passage and get surgical consultation			Urgent endoscopic removal if symptomatic If asymptomatic, allow spontaneous passage Endoscopic removal if -diameter > 25 mm, longer than 50 mm, or, not pass in 3 - 4 weeks	
	Multiple	If symptomatic, refer to a paediatric surgeon If asymptomatic, may opt for enteroscopy OR repeat film every 4 - 6 hours. Remove				If multiple and adherent - for inpatient observation: Repeat film every 4 hours Remove if no progression in 3 days or separates	

LOCATION		BEYOND DUODENUM					
		NASPGHAN	ESPGHAN	ASGE	COLORADO	CMU	SIGENP/AIGO
SHARP FOREIGN BODY		if no progression				If multiple or separate, for surgical removal	
	Symptomatic	Enteroscopy/ surgical removal	Enteroscopy/ surgical removal	Enteroscopy/ surgical removal	Symptomatic, for removal	Symptomatic, for removal	
	Asymptomatic	Allow spontaneous passage, remove if no progression in 3 days	Allow spontaneous passage in inpatient department setting, remove if no progression in 3 days	Allow spontaneous passage, remove if no progression in 3 days	Asymptomatic, allow spontaneous passage, daily radiograph, remove if no progression in 3 days	Allow spontaneous passage in inpatient department, surgical removal if no progression X-ray in 3 days	

**Source:**

1. Kramer RE, Lerner DG, Lin T, et al. North American Society for Pediatric Gastroenterology, Hepatology, and Nutr Endoscopy Committee. Management of ingested foreign bodies in children: a clinical report of the NASPGHAN Endoscopy Committee. *J Pediatr Gastroenterol Nutr.* 2015;60(4):562-574.
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4. Children's Hospital Colorado. Swallowed foreign body or object. Aurora (CO): Children's Hospital Colorado. Available at: <https://www.childrenscolorado.org/conditions-and-advice/conditions-and-symptoms/symptoms/swallowed-foreign-body-or-object/>
5. Khorana J, Tantivit Y, Phiuiphong C, et al. Foreign Body Ingestion in Pediatrics: Distribution, Management and Complications. *Medicina (Kaunas).* 2019;55(10):686.
6. Oliva S, Romano C, De Angelis P, et al. Foreign body and caustic ingestions in children: A clinical practice guideline. *Dig Liver Dis.* 2020;52(11):1266-1281.

**SUMMARY TABLE FOR SAFE DISCHARGE RECOMMENDATIONS BY INTERNATIONAL ORGANISATIONS AND INSTITUTIONS**

TYPE OF FOREIGN BODY (FB)		LOCATION/GUIDELINES						
		Oesophagus		Stomach And duodenum		Small bowel Beyond duodenum		Colon
<b>Blunt FB</b>	NASPGHAN	Needs intervention	NASPGHAN	Single institution guideline	NASPGHAN	Single institution guideline	NASPGHAN	Single institution guideline
	Needs intervention	Allow discharge and follow-up if asymptomatic	Allow SP if diameter <255 mm, length <50 mm; removal if no SP in 3 - 4 weeks	Allow discharge and follow-up if asymptomatic	Asymptomatic - SP; removal if no SP in 1 week	Allow discharge and follow-up if asymptomatic	Allow discharge and follow-up if asymptomatic	Allow SP if asymptomatic
<b>Sharp FB</b>			1. Radio-opaque FB - to discuss with family and decide on either conservative or intervention	Endoscopic removal	1. Radio-opaque FB - Allow discharge and follow-up if asymptomatic	Asymptomatic - SP; removal if no SP in 3 days	1. Radio-opaque FB - Allow discharge and follow-up if asymptomatic	Allow SP if asymptomatic
			2. Radiolucent FB - possible		2. Radiolucent FB - possible conservative or proceed		2. Radiolucent FB - possible conservative or proceed	

LOCATION/GUIDELINES									
TYPE OF FOREIGN BODY (FB)	Oesophagus		Stomach And duodenum		Small bowel Beyond duodenum		Colon		
	<b>Button battery (BB)</b>		conservative or proceed with US/CT/oesop hagogram (discuss with family and decide on either conservative or intervention)	Endoscopic removal	with US/CT/oesop hagogram (discuss with family and decide on either conservative or intervention)	Asymptomatic - SP; removal if no SP in 3 days	with US/CT/oesop hagogram (discuss with family and decide on either conservative or intervention)	Allow discharge and follow-up if asymptomatic, ingestion time <2 hours, ≥5 years of age and BB <20 mm	Allow discharge and follow-up if asymptomatic, ingestion time <2 hours, ≥5 years of age and BB <20 mm

TYPE OF FOREIGN BODY (FB)	LOCATION/GUIDELINES							
	Oesophagus		Stomach And duodenum		Small bowel Beyond duodenum		Colon	
Magnet		Allow discharge and follow-up if single magnet ingestion and asymptomatic	Single (follow-up as blunt objects)	Allow discharge and follow-up if single magnet ingestion and asymptomatic	Single (follow-up as blunt objects)	Allow discharge and follow-up if single magnet ingestion and asymptomatic		Allow SP if asymptomatic
Superalsorbent polymer								No recommendation

SP: Spontaneous passage FB- Foreign Body BB- Button Battery

**Source:**

- 1) Kramer RE, Lerner DG, Lin T, et al. North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition Endoscopy Committee. Management of ingested foreign bodies in children: a clinical report of the NASPGHAN Endoscopy Committee. J Pediatr Gastroenterol Nutr. 2015;60(4):562-574
- 2) Khorana J, Tantivit Y, Phuiphong C, et al. Foreign Body Ingestion in Pediatrics: Distribution, Management and Complications. Medicina (Kaunas). 2019;55(10):686.

## BUKU REKOD KESIHATAN BAYI DAN KANAK-KANAK (0-6 TAHUN)

### KESELAMATAN DI RUMAH

Awasi anak anda daripada kemalangan di rumah. Semua ibubapa harus mempelajari cara memberi pertolongan cemas.



Untuk maklumat lanjut dan video mengenai keselamatan bayi dan kanak-kanak kecil, layari laman sesawang ini:

- Langkah Pencegahan Kecelakaan Kanak-kanak (<https://www.infosihat.gov.my/multimedia/poster/item/tanda-bahaya-pada-kanak-kanak-b-malaysia.html>)
- Panduan Keselamatan Jalan Raya (<https://www.infosihat.gov.my/multimedia/poster/item/tanda-bahaya-pada-kanak-kanak-3.html>)
- Panduan Pencegahan Kecelakaan Kanak-Kanak (<https://www.infosihat.gov.my/multimedia/buku-kecil/item/pencegahan-kecederaan-kanak-kanak-2.html>)

**KESELAMATAN BAHAN PERMAINAN**

- Lebih besar daripada mulut anak
- Struktur yang kukuh.
- Tidak mudah ditanggal
- Tiada bahagian/bucu tajam.
- Tiada racun.
- Tiada tali/wayar panjang.
- Tidak boleh dikunyah.

Rujukan: Canadian Child Care Federation

**LIST OF ABBREVIATIONS**

AE(s)	adverse event(s)
AGREE	Appraisal of Guidelines for Research and Evaluation
AIGO	Italian Association of Hospital Gastroenterologists and Endoscopists
AP	Anteroposterior
AXR	Abdominal X-Ray
BB	Button Battery/ries
CI	Confidence Interval
CPG	Clinical Practice Guideline
CRP	C-Reactive Protein
CT	Computed Tomography
CXR	Chest X-Ray
DG	Development Group
ED	Emergency Department
EER	Emergent endoscopic removal
ENT	Ear, Nose and Throat
ESGE	European Society of Gastrointestinal Endoscopy
ESPGHAN	European Society for Paediatric Gastroenterology, Hepatology and Nutrition
ESR	Erythrocyte Sedimentation Rate
FB	Foreign Body
FC	Fecal Calprotectin
FL	Fecal Lactoferrin
GI	Gastrointestinal
GIT	Gastrointestinal Tract
GRADE	Grading Recommendations, Assessment, Development and Evaluation
HTA	Health Technology Assessment
mL	millilitres
MoH	Ministry of Health
MRE	Magnetic Resonance Enterography
MRI	Magnetic Resonance Imaging
NASPGHAN	North American Society for Paediatric Gastroenterology, Hepatology and Nutrition
NPO	Nil Per Oral
NS	Non-Significant
OR	Odds Ratio
PA	Posteroanterior
PAT	Paediatric Assessment Triangle
PPV	Positive Predictive Value
RC	Review Committee
RCH	Royal Children's Hospital
SAP	Superabsorbent polymer
Se	Sensitivity
SICUS	Small Intestine Contrast Ultrasonography
SIGENP	The Italian Society of Paediatric Gastroenterology, Hepatology and Nutrition
Sp	Specificity
USG	Ultrasonography

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